

AD-A157 127

GENERAL PLOT SUBROUTINE PACKAGE FOR THE HEWLETT PACKARD
5451C FOURIER ANALYZER(U) NAVAL BIODYNAMICS LAB NEW
ORLEANS LA D A FRANCIS DEC 84 NBDL-84R008

1/1

UNCLASSIFIED

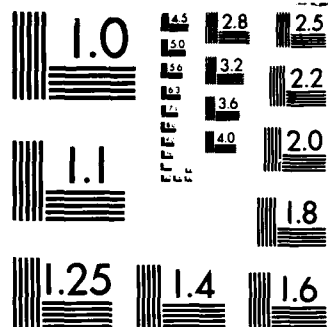
F/G 9/2

NL

END

POWER

FILE



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

2

NBDL-84R008

GENERAL PLOT SUBROUTINE PACKAGE FOR THE
HEWLETT PACKARD 5451C FOURIER ANALYZER®

Dorothy A. Francis



December, 1984

NAVAL BIODYNAMICS LABORATORY
New Orleans, Louisiana

DTIC
SELECTED
JUL 1985
E

Approved for public release. Distribution unlimited.

85 7 15 00

AD-A157 127

DTIC FILE COPY

DISCLAIMER NOTICE

**THIS DOCUMENT IS BEST QUALITY
PRACTICABLE. THE COPY FURNISHED
TO DTIC CONTAINED A SIGNIFICANT
NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.**

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NBDL-84R008	2. GOVT ACCESSION NO. AD-A157127	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) General Plot Subroutine Package for Hewlett Packard 5451C Fourier Analyzer®		5. TYPE OF REPORT & PERIOD COVERED Research Report
		6. PERFORMING ORG. REPORT NUMBER NBDL-84R008
7. AUTHOR(s) Dorothy A. Francis		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Biodynamics Laboratory P. O. Box 29407 New Orleans, LA 70189-0407		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS MF5852402E0005
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Medical Research & Development Command Bethesda, MD 20814		12. REPORT DATE December 1984
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES 83
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Hewlett Packard 5451C Fourier Analyzer®, Computer Program, Data Plotting, Documentation, Subroutines		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Hewlett Packard (HP) 5451C Fourier Analyzer® formerly supported two plot packages: one in the Fourier environment and one in the Real-Time Executive (RTE) environment. Thus, programs which produced graphic output in the Fourier environment could not run in the RTE environment and conversely. Therefore, it was necessary to develop a standard package of plot subroutines that could run under any operating system. The package is comprised of several FORTRAN subroutines which interact directly with the plot devices,		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 68 IS OBSOLETE
S/N 0102-LF-014-6601

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

and also provide the capability to plot to the operator's terminal. The plot package has been found to be extremely useful for graphic output on the HP-5451C® because it can run under any operating system. The plot package has been tested on the HP-5451C® system and can be recommended to users with a similar need.

S-N 0102-LF-014-6601

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

NBDL - 84R008

GENERAL PLOT SUBROUTINE PACKAGE FOR THE
HEWLETT PACKARD 5451C FOURIER ANALYZER®

Dorothy A. Francis

December 1984

Naval Medical Research and Development Command
Work Unit No. MF5852402E0005

Approved by

Released by

CDR W. W. McIntosh, MSC USN
Executive Officer

CAPT Robert J. Biersner, MSC USN
Commanding Officer

Naval Biodynamics Laboratory
P. O. Box 29407-0407
New Orleans, LA 70189

Accession For	
NTIS	<input checked="checked" type="checkbox"/>
DTIC	<input type="checkbox"/>
Unrestricted	<input type="checkbox"/>
Justification	<input type="checkbox"/>
By	
Distribution	
Availability	
Dist	
A-1	

Opinions or conclusions contained in this report are those of the author and do not necessarily reflect the views or the endorsement of the Department of the Navy. Approved for public release; distribution unlimited. Reproduction in whole or in part is permitted for any purpose of the United States Government.

SUMMARY

THE PROBLEM

For Time Executive (RTE)
The Hewlett Packard (HP) 5451C Fourier Analyzer formerly supported two plot packages: One in the Fourier environment and one in the RTE environment. Thus, programs which produced graphic output in the Fourier environment could not run in the RTE environment and conversely. Therefore, it was necessary to develop a standard package of plot subroutines that could run under any operating system. The package is comprised of several FORTRAN subroutines which interact directly with the plot devices, and also provide the capability to plot to the operator's terminal.

FINDINGS

data plotter
The plot package has been found to be extremely useful for graphic output on the HP-5451C because it can run under any operating system.

RECOMMENDATIONS

The plot package has been tested on the HP-5451C system and can be recommended to users with a similar need.

ACKNOWLEDGEMENTS

Mr. William Anderson designed and implemented many of the subroutines on the EAI Pacer 100® and the PDS Nova 800® systems. He also provided valuable technical and structural suggestions. The author also is indebted to Ms. Judy Holm for typing and assembling the manuscript in an excellent manner.

Trade names of materials or products of commercial or non-government organizations are cited only where essential for precision in describing research procedures or evaluation of results. Their use does not constitute official endorsement or approval of the use of such commercial hardware or software.

GENERAL PLOT SUBROUTINE PACKAGE FOR THE HEWLETT PACKARD 5451C FOURIER ANALYZER

INTRODUCTION

Data plotting is an integral part of any data acquisition and/or analysis software package. Plots are very helpful in data analysis and problem solving. Furthermore, results in graphical form are usually much easier to analyze than are the results in printed tabular form.

This subroutine package is a programming tool that allows the user to conveniently use various plot devices on the HP-5451C system. The plot devices used were the HP-9872T plotter and the operator's terminal. Libraries of compatible subroutines are provided which permit the user to generate a wide variety of plotted information including the following:

1. Labelled axes.
2. Textual data.
3. Graphs from data arrays (x and y), with optional scaling of either array and centered symbols denoting the location of a data point.
4. Variables from the FORTRAN IV calling program plotted in real or integer format.
5. Individual point and vector plotting.

The user also has control of the following:

1. "Pen" selection.
2. "Pen" position (up or down).
3. Origin of plotted information.
4. Scaling of plot.
5. Rotation of text and axes.
6. Generation of multi-page plots.

FUNCTION

The following subroutines are supplied:

PLOTS - Initializes plot software package for user's hardware and software configuration.

PLOT - Moves "pen" to specified (x,y) coordinates with "pen" in up or down position; permits origin control; controls pagination.

FACTO - Scales size of subsequent plotting data.

WHERE - Returns current position and factor to user program.

SYMB0 - Plots textual information (such as titles) at desired angle and size with additional capability of plotting special symbols for marking data points.

NUMBE - Plots each digit in a variable, including optional decimal point and truncation.

SCALE - Calculates parameters for axis annotation and size of plot for data array.

AXIS - Plots an axis, at desired angle, including segment markings and optional title.

LINE - Generates the plot of data in two arrays (x and y) with optional connecting lines and special symbols.

Four packages with identical subroutine calling sequences are available. The computer systems, plot peripherals, and unique characteristics of each package are summarized in Table 1.

Four interrelated coordinate systems are used, as shown in Figure 1. Embedded within the subroutines are two machine-dependent coordinate systems; one is defined in plotter machine units, the other in plotter physical inches. These are defined by PLOTS, and normally user will select the default parameters for the particular plotter selected. Users may also define their own imaginary plotting surface in which the relationship of the origin and scale relative to the plotter coordinate system are defined by PLOT and FACTOR. Finally, the relationship between "problem units" and the imaginary "user inches" is defined using SCALE.

SUBROUTINE DESCRIPTIONS

PLOTS

The routine PLOTS must be called at the start of a user program to initialize internal parameters. The call is:

CALL PLOTS (A,I)

A Resolution of plotter: inches/machine unit (0.0: defaults to hardware resolution).

I Logical unit for plot device (0: defaults to standard device address).

PLOTS initializes the scale factor to 1.0 (one user inch equals one physical inch) and sets the "pen" location and origin to (0.0, 0.0).

- NOTES:
- 1) "PLOTS" must be called before any other call to the subroutine package.
 - 2) The origin is initially at the bottom left of the page. (Top left for Printronix 300® printer).
 - 3) The X-axis runs horizontally across the page. The Y-axis runs vertically up the page. (X=down, Y=across for Printronix 300® printer.)
 - 4) Pen # 1 is selected for the HP-9872T® plotter.

PLOT

The routine PLOT causes "pen" motions to be output. PLOT controls the origin and pagination of the plot. The call is:

CALL PLOT (X, Y, I)

X X-coordinate (user inches) relative to most recent origin.

Y Y-coordinate (user inches) relative to most recent origin.

I Integer of the set (-3, -2, 3, 4, 10, -10, 11, 999).

-3 = move to (X,Y) pen up, set new origin to (X,Y).

-2 = move to (X,Y) pen down, set new origin to (X,Y).

2 = move to (X,Y) pen down.

3 = move to (X,Y) pen up.

10 = advance paper one full page.

-10 = advance paper one half page.

11 = End of plots; reset the HP-2648A® graphics terminal (first press). This frees the keyboard and clears I/O operations.

999 = same as 11 (included for completeness and compatibleness).

Note: All programs should be ended with the sequence:

CALL PLOT (0.,0.,10); CALL PLOT (0.,0.,-10); or CALL PLOT (0.,0.,11).

FACTOR

FACTOR allows the alteration of the overall scaling factor for plot size. The initial factor is set to 1.0 so that one (1) user inch equals one (1) physical inch. The call is:

CALL FACTOR (Z)

Z Ratio of desired plot size to current size.

1.0 = Reset overall scaling factor to 1.0.

The effects of multiple calls to FACTOR are cumulative.

WHERE

WHERE allows the user program to interrogate the plot package for the current overall scaling factor and the current (X,Y) location with respect to the current origin. The call is:

CALL WHERE (X,Y,Z)

X X-coordinate (user inches) with respect to current origin.

Y Y-coordinate (user inches) with respect to current origin.

Z Current overall scaling factor.

NUMBE

NUMBE plots floating point data in a format similar to FORTRAN IV F-format. One number is plotted for each call to NUMBE. The call is:

CALL NUMBE (X,Y,H,T,A,N)

X X-coordinate (user inches) of number relative to most recent origin.

Y Y-coordinate (user inches) of number relative to most recent origin.

H Height of number (user inches).

T Number (floating point).

A Angle of number to edge of paper (degrees CCW from X axis).

N Format control integer:

 0 T is truncated and plotted as an integer followed by ".".

 -1 T is truncated and plotted as an integer.

 +N N digits to the right of the decimal point are plotted.

SCALE

SCALE calculates the axis limits and distance between tic marks for an array to be used with AXIS and LINE to produce a properly annotated axis and a graph whose data include all points in a user specified length. SCALE does no plotting; it only provides data for AXIS and LINE. The call is:

CALL SCALE (A,S,N,I)

A Array containing data problem units to be scaled. (Where the dimensions are A(I, N+2)).

S Length of axis that data is to cover (user inches); number of tic marks +1.

N Number of data values in array A. (N must be greater than 0)

I Increment between data values in array A. (Used to allow data from 2-dimensional arrays, A(I, N+2).)

SCALE searches the data array A for minimum and maximum data values and selects convenient values (problem units) for tic marks on the axis. Tic marks are set one inch apart (user inches).

The calculated value (problem units) for the first tic mark is stored at A(N*J+1). The increment (problem units/user inch) between tic marks is stored at A(N*J+J+1), where J is the absolute value of I.

Note: If I is not equal to 1, a format incompatibility with AXIS exists.

AXIS

AXIS draws an axis with labeled tic marks at one inch intervals (user inches), with an optional title centered on the axis. The call is:

CALL AXIS (X,Y,T,N,S,A,F,D)

X X-coordinate at start of axis (user inches).

Y Y-coordinate at start of axis (user inches).

T Title (packed MSB, LSB).

- N Number of characters in title:
- on clockwise side of axis (normal for X).
 - + on counterclockwise side of axis (normal for Y).
- S Length of axis (user inches).
- A Angle in degrees CCW from machine X at which axis is drawn:
- 0.0 for X axis.
 - 90.0 for Y axis.
- F The starting value of first tic on axis (problem units).*
- D Increment between tic marks on axis (problem units).*

SYMB0

The SYMB0 routine has two major uses:

1. Print a character string.
2. Print a single character by value.

The call is:

CALL SYMB0 (X,Y,H,T,A,N)

- X X-coordinate (user inches) of symbol relative to most recent origin.
- Y Y-coordinate (user inches) of symbol relative to most recent origin.
- H Height of symbol (user inches).
- T Text string (packed MSB, LSB) or value of single symbol (0.0 - 127.0).
- A Angle of string or symbol CCW from machine X axis (degrees).
- N + = Number of characters in string.
- 0 = No action.
 - 1 = Draw symbol corresponding to value T at point X,Y.
 - 2 = Draw line from previous X,Y to desired X,Y, then draw symbol.

*F and D are usually supplied by SCALE. F is available in DATA(N+1).
D is available in A (N+2) in SCALE argument list.

LISTING OF A COMMAND FILE FOR AN
OVERLAY GENERATION USING THE PLOT PACKAGE

REFERENCE

Hewlett-Packard Company, "System Software Manual 5451C Fourier Analyzer System", Manual Part No. 05451-90519, Microfiche No. 05451-90520, Santa Clara, CA, November 1978.

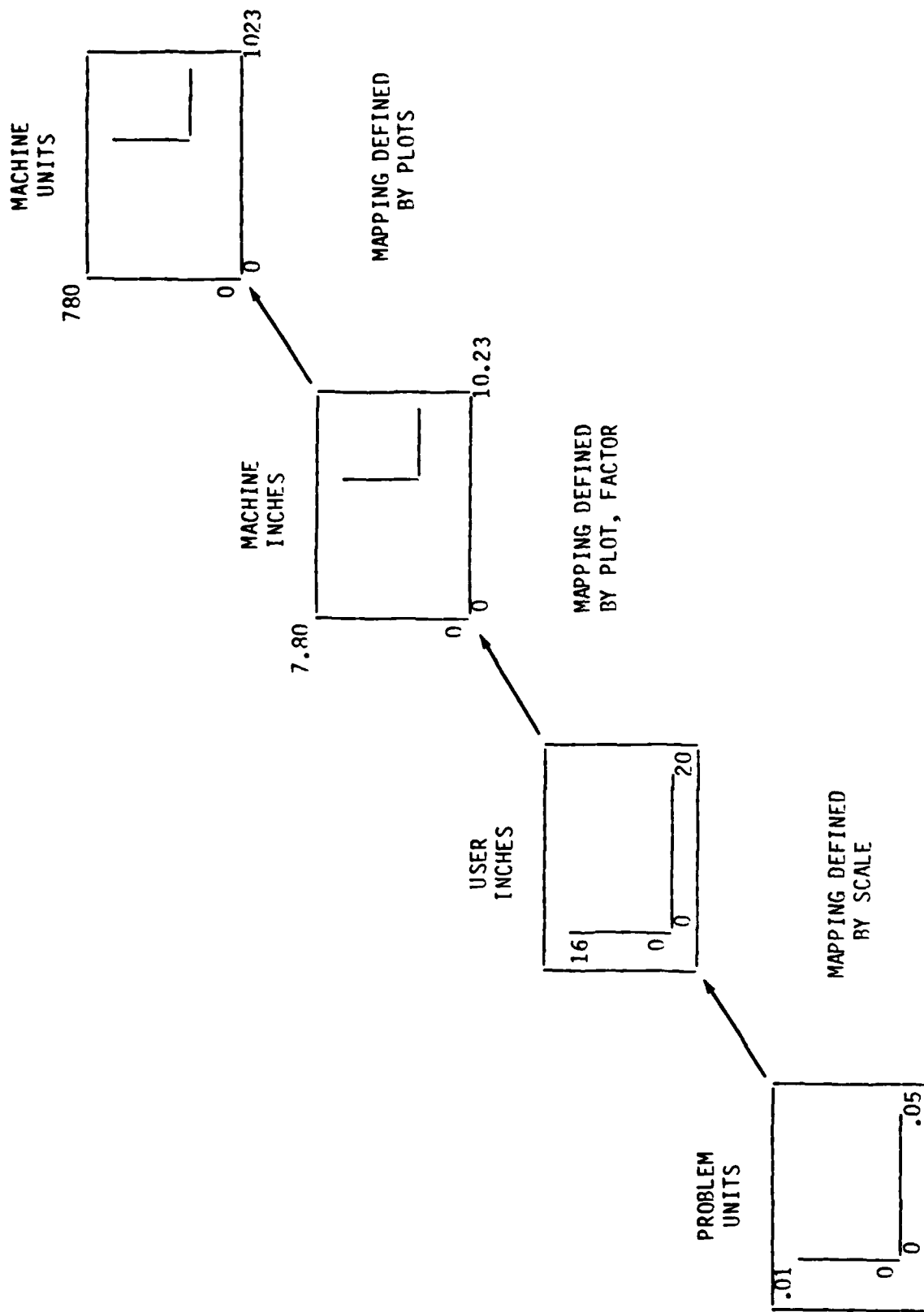


TABLE 2: SYMBOLS

1. 0	16. ±	32.	48. 0	64. G	80. P	96. ~	112. P
2. Δ	17. z	33. l	49. 1	65. A	81. Q	97. α	113. q
3. +	18.	34. "	50. 2	66. B	82. R	98. b	114. r
4. x	19.	35. #	51. 3	67. C	83. S	99. c	115. s
5. o	20.	36. \$	52. 4	68. D	84. T	100. d	116. t
6. <	21.	37. %	53. 5	69. E	85. U	101. e	117. u
7. x	22.	38. &	54. 6	70. F	86. V	102. f	118. v
8. z	23.	39. '	55. 7	71. G	87. W	103. g	119. w
9. y	24.	40. (56. 8	72. H	88. X	104. h	120. x
10. x	25.	41.)	57. 9	73. I	89. Y	105. i	121. y
11. x	26.	42. *	58. :	74. J	90. Z	106. j	122. z
12. x	27.	43. +	59. ;	75. K	91. [107. k	123. {
13. i	28.	44. ,	60. <	76. L	92. \	108. l	124. !
14. -	29.	45. -	61. =	77. M	93.]	109. m	125. }
15. ≡	30.	46. .	62. >	78. N	94. ↑	110. n	126. ~
	31.	47. /	63. ?	79. O	95. ↓	111. o	127. 0

TABLE 1: SUMMARY OF SUBROUTINE PACKAGES

SYSTEM	PLOT DEVICE	LOGICAL UNIT	X,Y PLOT LIMITS	RESOLUTION	SUBROUTINE FILE	I/O DRIVER FILE
PACER 100	HP7220	132)8	16", 10.5"	.001"	HP PLOT	HP10
PACER 100	TEK4010	1)8	10.24", 7.8"	.01"	-	-
NOVA 800	TEK4051	10	10.24", 7.8"	.01"	PLOT10:PLOT1B.LB	PLOT10:TEKLIB.LB
NOVA 800	PDS Display	34)8	10.24", 10.24"		-	-
NOVA 800	Printronix	-	Unlimited, 15"	.01"	PLOT300:PLOT1B.LB	NONE REQUIRED
HP5451C	HP 9872T	5830	15.75", 11.2"	.001"	PLTPK	NONE REQUIRED
HP5451C	HP 2648A	1	6.5", 4.5"	.0228"	PLTPK	NONE REQUIRED

Procedure to measure time to draw and label axes. Bits zero through five of the S-register will be on. Bits three through five will be turned off at the start of the axes operation. Bits zero through two will be the only bits on. Start timing at this point. Continue timing until all bits except zero through five are on. This signals the completion of the operation.

Plot package efficiency. The efficiency of the general plot subroutine package was measured using the procedures described earlier. A digital timer was used to time the plotting of data and the drawing and labeling of axes. The timing was also measured using the time base generator that is installed on the Fourier Analyzer. The total plot time was thirty-five seconds using the terminal as the plot device and one minute and twenty-eight seconds using the HP-9872T® plotter as the plot device. The time required to draw and label axes was thirty-one seconds using the terminal and one minute and eight seconds using the plotter.

The total plot time includes scaling the data, positioning the pen, plotting the data, and the drawing and labeling of axes. The time required to plot the data only was approximately 4.7 seconds on the terminal and 9.85 seconds on the plotter. The time required to produce a hardcopy of the plotted data is not included in any of the time measurements.

CONCLUSION

The plot package evaluation program, Y9000, was developed in the Fourier Operating System. Although relatively small in size (113 lines of coding), Y9000 required 2237 words of memory, indicating that the 5451C® utility routines for the Fourier system require a considerable amount of memory. Due to the lack of sufficient memory, only 128 words of data could be plotted. The plotting time is slow relative to data acquisition and sampling rates.

The general plot package presented herein is a valuable programming tool. Although somewhat limited in the Fourier Operating System, the package provides significant programming capabilities in the RTE operating system. As mentioned earlier, this package operates in both systems. The general plot package performance was not evaluated in the RTE Operating System because our data acquisition plans require using the Fourier Operating System. Nevertheless, the programming potential of the general plot package in the RTE Operating System are excellent.

The plot package evaluation program provides a means of determining the performance characteristics of the general plot subroutine package, thereby facilitating the estimation of throughput rates and response times for the Fourier system. The program has the following features:

1. A standard procedure to measure time to draw and label axes.
2. A standard procedure to measure time to plot data.
3. Capability to select a plot device interactively.
4. Validation of the major features of the plot package. These features include: A hardcopy from the terminal, pen selection on the HP-9872T® plotter, pagination on the plotter (which may be automatic or manual), and a user-defined scale factor.

FUNCTION:

Y9000 begins by requesting user input. The user must input the logical unit number of the plot device. The user is given the option to run the program with the standard values or with changes. The user may change the pen number and/or page size on the HP-9872T® plotter, request manual paging (if necessary) on the plotter, and/or change the scale factor.

The plot package is initialized and the 5451C utility routines are used to define 128 words of Fourier data and to store the data in X,Y arrays. The general plot subroutines are used to scale and plot the data, and to draw and label the axes. Bits zero through five of the S-register are turned on (set to 1) to signal the start of the plot operation. Some of these bits are turned off (set to 0) during the operation. Bits six through fifteen on (all bits on except 0 through 5) signals the completion of an operation. Bits zero through one of the S-register are turned on to signal the start of the drawing and labeling of axes. These bits are turned off to signal the completion of the operation. However, this action is so fast that the end of the program is signaled before the user notices it. Therefore, bits six through fifteen on signals the end of this operation also. A hardcopy of the plotted data is produced.

Procedure to measure time to plot data. Plot time and CPU utilization are the same. Bits zero through five of the S-register will be turned on at the start of the plotting operation. Start timing at this point. Some of the bits will be turned off during the operation. This is not a problem. Continue timing until bits six through fifteen (all bits except zero through five) are on. This signals the completion of plotting.

EVALUATION OF THE PLOT PACKAGE

A plot package evaluation program (Y9000) was developed in order to measure plot performance. The program was written in FORTRAN and was executed under the following machine conditions:

HP-5451C Fourier Analyzer® settings:

ADC CONTROLS

SAMPLE MODE TO KHz/ms
MULTIPLIER to TIME 100 (black 100)
EXT/INT to INT
OVERLOAD VOLTAGE SWITCH A to .8
INPUT SELECTOR to A
DISPLAY SELECTOR to A
TRIGGER SOURCE to FREE RUN
TRIGGER LEVEL to SLOPE

DISPLAY UNIT CONTROLS

CRT Portion:

MAGNIFIER to X1
DISPLAY to INT
INTENSITY as necessary
FOCUS and SCALE as desired
All level switches to center except DISPLAY TYPE to CONT

Control Portion:

GAIN to CAL
MODE to REAL/MAGNITUDE
POLAR ANG/DIV to any position
SCALE to straight up

The HP-3310A Function Generator settings:

FREQUENCY DIAL to 28
RANGE SWITCH to 10
DC OFFSET SWITCH to 0
FUNCTION SWITCH TO TRI (triangle)
OUTPUT LEVEL set with arrow pointing towards "+" sign by DC offset switch

where:

OVSFSA is the base command file for generating overlays.

OVCONA is the name of the command file for building the overlay.

N is the overlay number.

A is the revision (e.g., B would be revision 2).

N is the overlay number.

1 indicates send the test output to the printer (use 0 for output to the terminal).

After the overlay is generated and stored, the program is ready for execution. In order to execute the program, the user will have to boot up the Fourier System and give the following command via the keyboard:

USER PROG	n	n	n	n	ENTER
--------------	---	---	---	---	-------

USING THE PLOT PACKAGE

All of the plot subroutines and the utility routines have been merged to create two complete files. The file %PLTPK contains the source code and the file %PLTPK contains the binary code. These files are on the RTE and Fourier operating systems. Procedures for using the plot package on both systems are given below:

The program execution procedure using the plot package on the RTE operating system is as follows:

```
:LOADR, %PROGN          (Produce executable code)
    SE, %SUBR1
    SE, %SUBR1          (Includes user subroutines if required)
    .
    .
    SE, %SUBRN
    LIBRARY, %PLTPK     (Sets up %PLTPK as a library file)
    SL                  (Search %PLTPK)
    EN                  (End of command input - exit command mode
                        and finish load)
:PROGN                  (Execute program)
```

Procedures for using the plot package on the Fourier operating system are as follows:

Write your user programs in FORTRAN IV. Your program must have a name in the format "Ynnnn", where "Y" specifies that it is a user program and "nnnn" is a four-digit positive number (e.g., 1234), excluding numbers of resident user programs. For FORTRAN IV programming, all the interfacing is handled by the compiler. Define the program as a 'SUBROUTINE' and use "CALL" statements to use the utility routines.

Use the Overlay Generation procedure in Section III of the 5451C System Software Manual® to generate an overlay. The Overlay Generation procedure requires a command file containing a list of the user programs to be included in the overlay. The command file OVC05A may be used as a pattern for creating an overlay file that utilizes the plot package. A listing of OVC05A and the output from an Overlay Generation using OVC05A are given at the end of this section.

Once the command file has been created an overlay can be generated by using the command:

```
TR, OVSFSA, OVCONA, N, 1 (return)
```


FP2AS

The routine FP2AS converts a floating point number to an ASCII character string. The call is:

CALL FP2AS (FP, NASC, ASC, I)

FP Floating point value.

NASC Number of characters to be returned in ASCII string.

ASC Array in which ASCII character string is returned.

I Number of characters to left of decimal point (output).

PXPCO

The routine PXPCO stores and retrieves the current value of variables that are common to several programs. The call is:

CALL PXPCO (JST, LU, RE, OX, OY, SF, PX, PY)

JST 0: Store values.
 1: Retrieve values.

LU Logical unit for plot device.

RE(2) X,Y conversion factors to go from machine inches to machine units.

OX,OY Plot origin, in machine inches.

SF Conversion factor to go from user inches to machine inches.

PX,PY Current pen position.

The variables LU,, RE, OX, OY, SF, PX, and PY are initialized in the routine PLOTS. The only variable in the CALL statement that requires a number value is JST. If the user's program needs the variables, a call to PXPCO with JST equal to 1 has to be made. Whenever any of these variables are modified, a call to PXPCO with JST equal to 0 must be made in order to store the current values.

CALL HPCSZ (W,H)

W Width of characters in inches.

H Height of characters in inches.

HPOUT

The routine HPOUT causes plotter instructions to be output. An ASCII character string is created using one character per call and the string is output to the plotter when a terminator (;) is received. The call is:

CALL HPOUT (ICHAR)

ICHAR Character to output to plotter

HPPAG

The routine HPPAG controls pagination on the HP-9872T® plotter. Paper may be manually placed in position or advanced a full or half page. The call is:

CALL HPPAG (ISW)

ISW 1: Full page advance.
 2: Half page advance.
 3: Manually place sheet in position.

HPPEN

The routine HPPEN controls pen selection on the HP-9872T plotter. It provides the means to select a pen through program control. The call is:

CALL HPPEN (I)

I The pen position number; it must be an integer in the range 0 through 8.

0 Directs the pen arm to return the pen it is currently holding to its stall.

1-8 Directs the pen arm to fetch the desired pen.

UTILITY SUBROUTINES

Several utility subroutines are used in the general plot subroutine package and are included in the program file. Therefore, a brief description of each is given in this section.

PXPCG

The routine PXPCG extracts a specific character from a given character string (RHS first, LHS second). The call is:

CALL PXPCG (I0, I1, I2)

- I0 ASCII character string.
- I1 Number of the character to be extracted.
- I2 Word in which character is returned (RHS).

CGET

The routine CGET extracts a specific character from a given character string (LHS first, RHS second). The call is:

CALL CGET (I0, I1, I2)

- I0 ASCII character string.
- I1 Number of the character to be extracted.
- I2 Word in which character is returned (RHS).

HPCDR

The routine HPCDR specifies the absolute direction in which characters are lettered. HPCDR calculates run and rise values using an angle supplied and causes the character direction instruction to be output. The call is:

CALL HPCDR (TH)

- TH Angle between character base and machine X-axis in degrees.

HPCSZ

The routine HPCSZ specifies the size of characters and symbols. HPCSZ converts inches to centimeters and causes the character size instruction to be output. The call is:

Table 2 lists the available symbols. Symbols 0 to 31 are centered. Symbols 32 to 127 have their lower left corner at coordinate X,Y.

LINE

LINE combines pairs of data points in two arrays according to user-specified parameters. Points can be plotted with a special symbol (optional) and a line between points (optional). The call is:

CALL LINE (A,B,N,I,L,J)

A Name of array containing values for abscissa (problem units)

where: A(I,N+2): Array dimension.

I: Number of variables interlaced in array.

N: Number of points to be plotted.

A(1,N+1): Minimum value on axis (problem units, normally calculated by subroutine SCALE).

A(1,N+1): Problem units/user inch, normally calculated by subroutine SCALE.

B Name of array containing values for ordinate (problem units).
(Definitions are the same as A.)

N Number of points in each array to be plotted.

I Increment between points in array to be plotted (e.g., A(I,N)).

L Format control:

+L Points connected by line with symbol at point.

0 Points connected by line with no symbols.

-L Symbol at each point with no connecting line.

J Value of special symbol to be plotted.

OV005A T=00004 IS ON CR00022 USING 00006 BLKS R=0000

```
0001 00
0002 A,OVRLYN      'OV005A' 54451-14805 REV. A 24 AUG 83
0003 T,SNP510      BASE COMMAND FILE FOR USER OVERLAY GENERATION
0004               INSERT Y COMMAND NUMBERS BEFORE '0E'. AN EXAMPLE:
0005               '0,0077' , WHERE '0077'=4-DIGIT Y COMMAND NUMBER
0006 0,7001
0007 0,8000
0008 0E
0009
0010               CSORT+
0011               INSERT PROGRAM LOADS BETWEEN 'CSORT+' AND 'CSORT-'
0012               EXAMPLE: 'F,Y77JOB' , WHERE 'Y77JOB' = FILE NAME
0013                   'Y,Y0077' , WHERE 'Y0077' = PROG NAME
0014 F,%Y7001
0015 Y,Y7001
0016 F,%Y8000
0017 Y,Y8000
0018 F,%DEM01
0019 Y,DEM01
0020 F,%DEM03
0021 Y,DEM03
0022 F,%DEM04
0023 Y,DEM04
0024 F,%PLTPK
0025 Y,PLOT
0026 F,%PLTPK
0027 Y,PLOTS
0028 F,%PLTPK
0029 Y,FACTO
0030 F,%PLTPK
0031 Y,WHERE
0032 F,%PLTPK
0033 Y,SYMB0
0034 F,%PLTPK
0035 Y,NUMBE
0036 F,%PLTPK
0037 Y,SCALE
0038 F,%PLTPK
0039 Y,AXIS
0040 F,%PLTPK
0041 Y,LINE
0042 F,%PLTPK
0043 Y,PXPCG
0044 F,%PLTPK
0045 Y,CGET
0046 F,%PLTPK
0047 Y,HPCDR
0048 F,%PLTPK
0049 Y,HPCSZ
0050 F,%PLTPK
0051 Y,HPOUT
0052 F,%PLTPK
0053 Y,HPPAG
0054 F,%PLTPK
0055 Y,HPPEN
0056 F,%PLTPK
0057 Y,PXPCO
0058 F,%PLTPK
0059 Y,FP2AS
0060
0061 CSORT-
0062 F,N3500A
0063 L,**
0064 F,N3501A
```

0064 L,**
0065 F,A3060B
0066 L,**
0067 U,**
0068 E,01
0069 ::
0070 \$\$

LISTING OF AN OVERLAY GENERATION OF THE
GENERAL PLOT PACKAGE DEMONSTRATION PROGRAM

END OF UPDAT-7K02

000042	Y7001	%Y7001	Y	0
000056	HPPEN	%PLTPK	Y	0
000057	WHERE	%PLTPK	Y	0
000074	PXPCG	%PLTPK	Y	0
000074	CGET	%PLTPK	Y	0
000111	FACTO	%PLTPK	Y	0
000163	HPCSZ	%PLTPK	Y	0
000170	HPCDR	%PLTPK	Y	0
000201	HPPAG	%PLTPK	Y	0
000256	PXPCO	%PLTPK	Y	0
000273	LINE	%PLTPK	Y	0
000313	HPOUT	%PLTPK	Y	0
000316	DEM03	%DEM03	Y	0
000327	DEM01	%DEM01	Y	0
000336	Y8000	%Y8000	Y	0
000336	PLOTS	%PLTPK	Y	0
000370	FP2AS	%PLTPK	Y	0
000377	NUMBE	%PLTPK	Y	0
000475	SCALE	%PLTPK	Y	0
000617	PLOT	%PLTPK	Y	0
000640	DEM04	%DEM04	Y	0
001265	AXIS	%PLTPK	Y	0
002012	SYMB0	%PLTPK	Y	0

ADDRESS	PGMNAM	LIBNAM	CONTROL	LENGTH
---------	--------	--------	---------	--------

56442	AXIS	%PLTPK	Y	01265
57727	Y7001	%Y7001	Y	00042
57771	HPPEN	%PLTPK	Y	00056
60047	SYMB0	%PLTPK	Y	02012
62061	DEM04	%DEM04	Y	00640
62721	PLOT	%PLTPK	Y	00617
63540	HPPAG	%PLTPK	Y	00201
63741	WHERE	%PLTPK	Y	00057
64020	SCALE	%PLTPK	Y	00475
64515	NUMBE	%PLTPK	Y	00377
65114	FP2AS	%PLTPK	Y	00370
65504	LINE	%PLTPK	Y	00273
65777	PLOTS	%PLTPK	Y	00336
66335	Y8000	%Y8000	Y	00336
66673	DEM01	%DEM01	Y	00327
67222	DEM03	%DEM03	Y	00316
67540	HPCDR	%PLTPK	Y	00170
67730	PXPCG	%PLTPK	Y	00074
70024	HPOUT	%PLTPK	Y	00313
70337	PXPCO	%PLTPK	Y	00256
70615	HPCSZ	%PLTPK	Y	00163
71000	FACTO	%PLTPK	Y	00111
71111	CGET	%PLTPK	Y	00074
71205				

*
* F,%PLTPK
* Y,SYMB0

SYMB0 60047 62060 01021 01061

*LOAD0

*
* F,%DEM04
* Y,DEM04

DEM04 62061 62720 01016 01020

*LOAD0

*
* F,%PLTPK
* Y,PLOT

PLOT 62721 63537 01014 01015

*LOAD0

*
* F,%PLTPK
* Y,HPPAG

HPPAG 63540 63740

*LOAD0

*
* F,%PLTPK
* Y,WHERE

WHERE 63741 64017 01013 01013

*LOAD0

*
* F,%PLTPK
* Y,SCALE

SCALE 64020 64514 01010 01012

*LOAD0

SANTA CLARA DIVISION AUTO OVRLAY GENERATION-6K15

 * A,OVRLYN 'OVCO5A' 54451-14805 REV. A 24 AUG 83
 * T,SNF51C BASE COMMAND FILE FOR USER OVERLAY GENERATION

*ENTER USERCOMMAND NUMBERS, OR TYPE "?"

* INSERT Y COMMAND NUMBERS BEFORE 'QE'. AN EXAMPLE:
 * 'Q,0077', WHERE '0077'=4-DIGIT Y COMMAND NUMBER
 * Q,7001

Y7001
 Y%COM 01075 01075 00434 00435
 * Q,8000

Y8000
 Y%COM 01074 01074 00436 00437
 * QE
 Y%COM 00440 00441
 47440 47440

TYPE "L" TO LOAD USERCOMMAND LIBRARY

 * CSORT+
 * INSERT PROGRAM LOADS BETWEEN 'CSORT+' AND 'CSORT-'
 * EXAMPLE: 'F,Y77JOB', WHERE 'Y77JOB' = FILE NAME
 * 'Y,Y0077', WHERE 'Y0077' = PROG NAME
 * F,%PLTPK
 * Y,AXIS

AXIS 56442 57726 01066 01073

*LOAD@

 *
 * F,%Y7001
 * Y,Y7001

Y7001 57727 57770 01063 01065

*LOAD@

 *
 * F,%PLTPK
 * Y,HPPEN

HPPEN 57771 60046 01062 01062

*LOAD@

*
* F,%PLTPK
* Y,NUMBE

NUMBE 64515 65113 01006 01007

*LOAD@

*
* F,%PLTPK
* Y,FP2AS

FP2AS 65114 65503

*LOAD@

*
* F,%PLTPK
* Y,LINE

LINE 65504 65776

*LOAD@

*
* F,%PLTPK
* Y,PLOTS

PLOTS 65777 66334

*LOAD@

*
* F,%Y8000
* Y,Y8000

Y8000 66335 66672 01002 01005

*LOAD@

*
* F,%DEM01
* Y,DEM01

DEM01 66673 67221 01001 01001

*LOAD@

*
* F,%DEM03
* Y,DEM03

DEM03 67222 67537

*LOAD@

*
* F,%PLTPK
* Y,HPCDR

HPCDR 67540 67727 00777 01000

*LOAD@

*
* F,%PLTPK
* Y,PXPCG

PXPCG 67730 70023 00767 00776

*LOAD@

*
* F,%PLTPK
* Y,HPOUT

HPOUT 70024 70336

*LOAD@

*
* F,%PLTPK
* Y,PXPCO

PXPCO 70337 70614

*LOAD@

*
* F,%PLTPK
* Y,HPCSZ

HPCSZ 70615 70777

*LOAD@

 *
 * F,%PLTPK
 * Y,FACTO

FACTO 71000 71110

*LOAD@

 *
 * F,%PLTPK
 * Y,CGET

CGET 71111 71204

*LOAD@

 *
 * CSORT-
 *
 * F,N3500A
 * L,**

FRMTR	71205	75017	00546	00766
MOD	75020	75037		
MXMNI	75040	75153		
MXMNR				

*LX7

MIN1
 75154 75261
 DBLE 75262 75313
 SNGL 75314 75356
 .XPAK 75357 75544
 .XCOM 75545 75612
 .XFER 75613 75650
 ALOGT 75651 75657

*LOAD@

 * F,N3501A
 * L,**

ATAN	75660	76006
ABS	76007	76013
.ITOI	76014	76126
.GOTO	76127	76150
IABS	76151	76157

COMPUTED GO TO

*LOAD@

 * F,A3060B
 * L,**

D.05		00062 00062
" " "	76160 76162	
D.06		00060 00060
" " "	76163 76165	
D.33		00063 00063
" " "	76166 76170	
D.35		00061 00061
" " "	76171 76173	
D.76		00055 00055
" " "	76174 76176	
I.05		00046 00046
" " "	76177 76200	
C.33		00045 00045
" " "	76201 76202	

*LOAD@

 * U,**

*UNDEFINED SYMBOLS
 BLANK DTAD GKPLT

*AVAILABLE MEMORY
 76203 76224
 00442 00545

*LOAD@

 * E,01

*USER LINKS
 76225 76233
 00546 01777

*OVERLAY SYMBOL TABLE

.BIO. 74434	.DFER 75613	.DIO. 74353 01065,I
.DTA. 74502 01063,I	.GOTO 76127 01015,I	.IAR. 74300
.IAY. 74245	.IIO. 74020 01064,I	.IOI. 74153
.IOR. 74112	.ITOI 76014 01024,I	.LDR. 75601
.LST. 70101	.RAR. 74256	.RAY. 74234
.RIO. 74032	.XAY. 74203	.XCOM 75545 00640,I
.XFER 75622 00642,I	.XIO. 74047	.XPAK 75357 00610,I
RES 76007 01007,I	ALOGT 75651 01010,I	AMAX0 75040
AMAX1 75154 01012,I	AMIN0 75052	AMIN1 75166 01011,I
ARCTA 75660	ATAN 75660 01001,I	AXIS 56456 01016,I
BCS 70526	BLANK ? ? ? 01233,I	C.33 76201 00045,I
CGET 71114 01047,I	D.05 76160 00062,I	D.06 76163 00060,I
D.33 76166 00063,I	D.35 76171 00061,I	D.76 76174 00055,I
DBLE 75262 00574,I	DEM01 66705 01005,I	DEM03 67346 01003,I
DEM04 62401 01002,I	DTAD ? ? ? 01573,I	FACTO 71005
FP2AS 65132 01000,I	GKPLT ? ? ? 01234,I	HPCDR 67553 01060,I
HPCSZ 70631 01061,I	HPOUT 70175 01027,I	HPPAG 63545 01014,I
HPPEN 57776 01004,I	I.05 76177 00046,I	IABS 76151 01072,I
LINE 65512 01017,I	MAX0 75045	MAX1 75161
MIN0 75057 00777,I	MOD 75022 01037,I	NEWIO 74452
NUMBE 64523 01067,I	OLDIO 74457	PLOT 62742 01070,I
PLOTS 66011	PXPCG 67733 01040,I	PXPCO 70365 01073,I

SCALE 64036 01020,I SNGL 75314 00573,I SYMB0 61121 01066,I
JHEPE 63750 01006,I Y7001 57731 01075,I Y8000 66341 01074,I

*LINKS
00546 01777

*AVAILABLE MEMORY
76203 76224
00442 00545

*END

*LOAD0

::

\$" ENCOUNTERED, OVERLAY GENERATION TERMINATED

LISTINGS OF THE GENERAL PLOT PACKAGE SUBROUTINES


```

2      SUBROUTINE PLOTS(RS,IA)
3 C
4 C      RS      RESOLUTION
5 C              0.0->0.01 (DEFAULT)
6 C      IA      LOGICAL UNIT FOR OUTPUT
7 C              0->10: TEKTRONIX DISPLAY (DEFAULT)
8 C              1:  HP-2648A GRAPHICS TERMINAL
9 C              5:  HP-9872T PLOTTER (RTE SYSTEM)
10 C             30:  HP-9872T PLOTTER (FOURIER SYSTEM)
11 C
12 C      REV 08 FEB 82:  CHANGE FILE NAME TO 'PLOTS'
13 C      REV 22 JUN 83:  SUPPORT HP-9872T PLOTTER
14 C                      :  INITIALIZE PLOTTER & ENABLE PAPER CUTTER
15 C                      :  SELECT PEN #1
16 C      REV 01 SEP 83:  SUPPORT HP-2648A GRAPHICS TERMINAL
17 C                      :  MODIFIED TO RUN ON FOURIER SYSTEM
18 C                      :  COMMON STATEMENT REMOVED
19 C                      :  A CALL TO SUBROUTINE 'PNPCO' WAS ADDED
20 C
21 C
22 C      LU      LOGICAL UNIT FOR PLOT OUTPUT
23 C      MP      INDEX TO LAST USED WORD IN MB BUFFER
24 C      MB      BUFFER FOR OUTPUT TO PLOT DEVICE (NOT READ FOR ALL DEVICES)
25 C      RE(2):  X,Y CONVERSION FACTORS TO GO FROM MACHINE INCHES TO
26 C
27 C              MACHINE UNITS
28 C      OX,OY:  PLOT ORIGIN, IN MACHINE INCHES
29 C      SF:     CONVERSION FACTOR TO GO FROM USER INCHES TO MACHINE INCHES
30 C
31 C      REAL AR(2),RE(2)
32 C      DATA AR/1.0,1.0/
33 C      DATA IESTR/015452B/,LDLA/062141B/,ICK/041513B/
34 C      DATA IESLH/015550B/,IESCJ/015512B/
35 C
36 C      INITIALIZE PLOT ORIGIN IN MACHINE INCHES
37 C      OX=0.0
38 C      OY=0.0
39 C
40 C      INITIALIZE PEN POSITION IN USER UNITS
41 C      PX=0.0
42 C      PY=0.0
43 C
44 C      INITIALIZE SCALE FACTOR TO 1.0
45 C      SF=1.0
46 C
47 C      DEFINE OUTPUT LOGICAL UNIT
48 C      LU=IA
49 C      IF(LU.EQ.0) LU=10
50 C
51 C      DEFINE FACTOR FOR CONVERSION FROM MACHINE INCHES TO MACHINE UNITS
52 C      RT=RS
53 C      IF((RT.LE.0.0) .AND. (LU.EQ.1)) RT=.0228
54 C      IF((LU.NE.5) .AND. (LU.NE.30)) GO TO 100
55 C      IF(RT.LE.0.0) RT=1./400./2.54
56 C      IF(RT.LE.0.0) RT=.01
57 C      RE(1)=RT*AR(1)

```

E 2 PLOTS OPTS: LNI 3:25 PM WED., 26 DEC., 1984

```
7      RE(2)=RT*AR(2)
8 C
9 C      STORE VALUES
10 150  CALL PXP00(0,LU,RE,OX,OY,SF,PX,PY)
11 C
12      IF(LU.EQ.1) GO TO 230
13 C      ADVANCE PAPER AND INITIALIZE PLOTTER
14      WRITE(LU,200)
15 200  FORMAT("AF;IN")
16 C
17 C      SELECT PEN #1
18      WRITE(LU,220)
19 220  FORMAT("SP1")
20      GO TO 250
21 C
22 C      CLEAR SCREEN (ALPHANUMERIC DISPLAY)
23 230  CONTINUE
24      WRITE(LU,240) IESLH,IESCJ
25 C
26 C      CLEAR GRAPHIC MEMORY AND TURN ON GRAPHIC DISPLAY & CURSOR
27      WRITE(LU,240) IESTR,LDLA,ICK
28 240  FORMAT(4R2)
29 C
30 250  RETURN
31      END
```

14% COMPILER: HP92834 REV.2226 (820503)

* NO WARNINGS ** NO ERRORS ** PROGRAM: 206 COMMON: (NONE)

5 8 SYMBO OPTS: LMI 3:27 PM WED., 26 DEC., 1984

```
7      CALL HPOUT(1HB)
8 210   CALL HPOUT(IAND(JCH,377B)*2**8)
9      IF(LU.NE.30) GO TO 215
0      CALL HPOUT(177B)
1 215   CALL HPOUT(3*256)
2      CALL HPOUT(1H;)
3      X=X+W1*CO
4      Y=Y+W1*SI
5      CALL PLOT(X,Y,3)
6      GO TO 40
7 C
8      END
```

4% COMPILER: HP92834 REV.2226 (820503)

NO WARNINGS ** NO ERRORS ** PROGRAM: 1000 COMMON: (NONE)

```

32 20    RETURN
33 C
34 C      INITIALIZE TO START OF CHARACTER STRING
35 30    NC0=NC
36      I0=0
37 C
38 C      GET NEXT CHARACTER IN STRING
39 40    NC0=NC0-1
40      IF(NC0.LT.0) GO TO 20
41      I0=1+I0
42      CALL CGET(ASC, I0, JCH)
43 50    IF(LU.NE.1) GO TO 55
44      ICH=IAND(JCH,177B)
45      I3=SYM(JCH+1)
46      IF(JCH.GE.32) GO TO 60
47      GO TO 56
48 55    JCH=IAND(JCH,177B)
49      IF(JCH.GE.32) GO TO 200
50 56    CONTINUE
51 C
52 C      SPECIAL PLOT CHARACTER MUST BE CENTERED, MOVE PEN
53      I3=SYM(JCH+1)
54      IP=3
55      I1=0
56      X=X+H*(-2.*CO+3.*SI)
57      Y=Y+H*(-3.*CO-2.*SI)
58      XW=X
59      YW=Y
60      GO TO 110
61 60    IP=2
62      I3=1+I3
63 C
64 C      GET 8 BIT DEFINITION OF NEXT CHARACTER SEGMENT
65      CALL PXPBG (STB, I3, I1)
66 C
67 C      DECODE SEGMENT DEFINITION
68      I2=MOD(I1, 64)
69      IF(I1.GE.64) IP=3
70      IY=I2/8
71      IX=I2-8*IY
72      X1=IX
73      Y1=IY
74 C
75 C      DRAW SEGMENT
76      XW=X+H*(X1*CO-Y1*SI)
77      YW=Y+H*(Y1*CO+X1*SI)
78 110    CALL PLOT (XW, YW, IP)
79      IF(I1.LT.192) GO TO 60
80      X=XW
81      Y=YW
82      GO TO 40
83 C
84 C      WRITE A NORMAL CHARACTER
85 C
86 200    CALL HPLOT(1HL)

```

```

277 DATA STC337/ 13171, 12486, 2156, 1114
278 1, 16838, 16899, 12594, 8390/
279 DATA STC345/ 8536, 538, 9050, 1052
280 1, 8390, 8536, 7203, -14844/
281 DATA STC353/ 6216, 8993, 3100, 259
282 1, -14840, 24624, 13106, 7212/
283 DATA STC361/ 4627, -14816, 13380, 12900
284 1, 10289, 4376, 9234, 8390/
285 DATA STC369/ 8784, -14812, 3075, 4371
286 1, 8472, -14812, 9057, 2674/
287 DATA STC377/ -14845, 2144, 769, 25612
288 1, -14844, 608, -14812, 352/
289 DATA STC385/ 786, -14812, 24612, -14844
290 1, 833, 13324, 6256, 5137/
291 DATA STC393/ 24774, 36, -14844, 2370
292 1, 6161, 10529, -15054, 4674/
293 DATA STC401/ 12898, 16838, 4618, 8731
294 1, 12586, 20677, 6937, -14812/
295 DATA STC409/ 13360, 4, 28724, -14844
296 1, 0, 0, 0, 0/
297 C MID POINT X, Y COORD & ROTATION CONSTANTS
298 X=XA
299 Y=YA
300 H=TH*0.0174532925
301 SI=SIN(H)
302 CO=COS(H)
303 H=HI/7.0
304 C
305 CALL PXPCC(1,LU,RE,OX,OY,SF,PX,PY)
306 C
307 IF(LU.EQ.1) GO TO 4
308 C
309 C SET CHARACTER SIZE
310 C
311 H0=HI*SF
312 W0=W0*2./3.
313 W1=W0*1.3333/SF
314 CALL HPCSZ(W0,H0)
315 C
316 C SET DIRECTION IN WHICH CHARACTERS ARE TO BE LETTERED
317 C
318 CALL HPCDR(TH)
319 C
320 4 CONTINUE
321 C
322 C MOVE TO NEW POINT
323 IP=3
324 IF(NC.EQ.-2) IP=2
325 CALL PLOT(XA,YA,IP)
326 IF(NC>10,20,30)
327 C
328 C SINGLE CHAR IS TO BE PLOTTED
329 10 NC0=0
330 JCH=ASC(1)+0.1
331 GO TO 50

```

```

222 1,-14804, 833, 12866,-14807/
223 DATA STC121 12648, 11315, 2048, 1024
224 1, 28870, 11316, 6938, 3092/
225 DATA STC129/ 259,-14840, 13123, 4120
226 1,-14828, 328, 3075, 8988/
227 DATA STC137/ 12320,-14796, 7000, 3092
228 1, 259, 8200, 13362, 28870/
229 DATA STC145/ 11316, 273, 16838, 3075
230 1, 6932, 8217, 12584, 11315/
231 DATA STC153/ 6948, 4185, 264, 710
232 1, 11284, 12595, 8232, 7193/
233 DATA STC161/ 16838, 20737,-14831, 2625
234 1, 25106,-14814, 6211,-14797/
235 DATA STC169/ 5200, 8292, 16838, 12572
236 1, 17094, 20994, 11300, 12595/
237 DATA STC177/-14808, 323, 10248, 13105
238 1, 5164, 6674,-14804, 12832/
239 DATA STC185 1060, 5200, 12486, 11315
240 1, 6948, 23320, 3092, 3/
241 DATA STC193/ 27848, 12595, 2088, 769
242 1,-14836, 3075, 13100, 28976/
243 DATA STC201/-14847, 13360, 6235, 1088
244 1, 12486, 23092,-14824, 13164/
245 DATA STC209/ 10289, 264, 5124,-14829
246 1, 22576, 29724,-14844, 833/
247 DATA STC217/ 12866, 13169, 18630, 769
248 1, 13324, 12486, 6260,-14844/
249 DATA STC225/ 16432,-14844, 6704, 1076
250 1, 12486, 3176, 1140, 18630/
251 DATA STC233/ 769, 11276, 12595, 2088
252 1, 12486, 11315, 6948,-14824/
253 DATA STC241/ 328, 3075, 13100, 10289
254 1, 21000,-14844, 13104, 9260/
255 DATA STC249/ 6171, 1114, 18630, 769
256 1, 5132, 6427, 10272, 13105/
257 DATA STC257/-14804, 13424, 626, 28870
258 1, 264, 3075,-14796, 624/
259 DATA STC265 -14796, 368, 794,-14796
260 1, 11272, 28724, 3112,-14844/
261 DATA STC273 10352, 538, 11380,-14822
262 1, 13424, 2092, 1024, 29382/
263 DATA STC281 48,-15358, 12356, 710
264 1, 12338, 22724, 7210, 2666/
265 DATA STC289/ 19142, 10776, 7256, 28870
266 1,-14821, 6216, 8737, 532/
267 DATA STC297/ 2049, 1124, 12486, 8784
268 1, 7203, 780, 4098, 25798/
269 DATA STC305/ 6177, 264,-14844, 1140
270 1, 8788, 6177, 264, 5122/
271 DATA STC313/ 20678, 7188, 8483, 2072
272 1, 769, 17094, 13098, 7001/
273 DATA STC321/ 16838, 3075, 25652, 12594
274 1, 6184, 4625,-14812, 24624/
275 DATA STC329 7203,-14844, 833, 6722
276 1, 27161,-14806, 577, 8971/

```

167	DATA SYN 25/	125,	125,	125,	125
168	1,	125,	125,	125,	125/
169	DATA SYN 33/	125,	126,	136,	141
170	1,	150,	161,	174,	186/
171	DATA SYN 41/	190,	195,	200,	207
172	1,	212,	215,	218,	221/
173	DATA SYN 49/	223,	234,	240,	249
174	1,	260,	266,	276,	287/
175	DATA SYN 57/	293,	311,	321,	326
176	1,	332,	336,	341,	345/
177	DATA SYN 65/	354,	366,	373,	385
178	1,	394,	402,	409,	414/
179	DATA SYN 73/	424,	430,	437,	443
180	1,	448,	452,	457,	463/
181	DATA SYN 81/	473,	480,	492,	501
182	1,	514,	519,	526,	530/
183	DATA SYN 89/	536,	544,	552,	559
184	1,	564,	567,	571,	577/
185	DATA SYN 97/	583,	586,	597,	607
186	1,	614,	625,	635,	641/
187	DATA SYN105/	654,	660,	668,	675
188	1,	681,	687,	697,	704/
189	DATA SYN113/	714,	724,	735,	740
190	1,	748,	754,	762,	766/
191	DATA SYN121/	772,	776,	785,	790
192	1,	798,	803,	811,	816/
193	DATA STC 1/	10842,	2088,	11276,	-9686
194	1,	10842,	8233,	2320,	5131/
195	DATA STC 9/	11044,	-9686,	10842,	3080
196	1,	-9686,	2666,	7256,	18650/
197	DATA STC 17/	26668,	-9716,	10842,	2584
198	1,	10780,	23258,	10776,	6684/
199	DATA STC 25/	-9718,	11336,	3112,	26842
200	1,	2092,	22796,	-9701,	10330/
201	DATA STC 33/	6764,	-9718,	11354,	8547
202	1,	24872,	2065,	4945,	21260/
203	DATA STC 41/	-9693,	11336,	3176,	10826
204	1,	7256,	23258,	11304,	3080/
205	DATA STC 49/	-9702,	10826,	22746,	-9700
206	1,	7256,	11368,	3144,	24794/
207	DATA STC 57/	20516,	18708,	-9685,	10842
208	1,	9057,	4945,	-14630,	577/
209	DATA STC 65/	2314,	20993,	12849,	-14830
210	1,	12641,	9075,	16838,	29489/
211	DATA STC 73/	24579,	21540,	-14832,	2888
212	1,	6932,	8217,	11305,	626/
213	DATA STC 81/	18630,	26924,	12328,	10545
214	1,	836,	3083,	-14844,	596/
215	DATA STC 89/	2049,	8976,	12843,	6441
216	1,	-14844,	10849,	-14798,	8563/
217	DATA STC 97/	785,	29126,	4899,	-14847
218	1,	10826,	4196,	5216,	19142/
219	DATA STC105/	22570,	-14820,	4631,	22726
220	1,	-14820,	321,	13510,	18630/
221	DATA STC113/	12584,	11315,	780,	2049

```

112 EQUIVALENCE (STB( 25), STC 25(1))
113 EQUIVALENCE (STB( 33), STC 33(1))
114 EQUIVALENCE (STB( 41), STC 41(1))
115 EQUIVALENCE (STB( 49), STC 49(1))
116 EQUIVALENCE (STB( 57), STC 57(1))
117 EQUIVALENCE (STB( 65), STC 65(1))
118 EQUIVALENCE (STB( 73), STC 73(1))
119 EQUIVALENCE (STB( 81), STC 81(1))
120 EQUIVALENCE (STB( 89), STC 89(1))
121 EQUIVALENCE (STB( 97), STC 97(1))
122 EQUIVALENCE (STB(105), STC105(1))
123 EQUIVALENCE (STB(113), STC113(1))
124 EQUIVALENCE (STB(121), STC121(1))
125 EQUIVALENCE (STB(129), STC129(1))
126 EQUIVALENCE (STB(137), STC137(1))
127 EQUIVALENCE (STB(145), STC145(1))
128 EQUIVALENCE (STB(153), STC153(1))
129 EQUIVALENCE (STB(161), STC161(1))
130 EQUIVALENCE (STB(169), STC169(1))
131 EQUIVALENCE (STB(177), STC177(1))
132 EQUIVALENCE (STB(185), STC185(1))
133 EQUIVALENCE (STB(193), STC193(1))
134 EQUIVALENCE (STB(201), STC201(1))
135 EQUIVALENCE (STB(209), STC209(1))
136 EQUIVALENCE (STB(217), STC217(1))
137 EQUIVALENCE (STB(225), STC225(1))
138 EQUIVALENCE (STB(233), STC233(1))
139 EQUIVALENCE (STB(241), STC241(1))
140 EQUIVALENCE (STB(249), STC249(1))
141 EQUIVALENCE (STB(257), STC257(1))
142 EQUIVALENCE (STB(265), STC265(1))
143 EQUIVALENCE (STB(273), STC273(1))
144 EQUIVALENCE (STB(281), STC281(1))
145 EQUIVALENCE (STB(289), STC289(1))
146 EQUIVALENCE (STB(297), STC297(1))
147 EQUIVALENCE (STB(305), STC305(1))
148 EQUIVALENCE (STB(313), STC313(1))
149 EQUIVALENCE (STB(321), STC321(1))
150 EQUIVALENCE (STB(329), STC329(1))
151 EQUIVALENCE (STB(337), STC337(1))
152 EQUIVALENCE (STB(345), STC345(1))
153 EQUIVALENCE (STB(353), STC353(1))
154 EQUIVALENCE (STB(361), STC361(1))
155 EQUIVALENCE (STB(369), STC369(1))
156 EQUIVALENCE (STB(377), STC377(1))
157 EQUIVALENCE (STB(385), STC385(1))
158 EQUIVALENCE (STB(393), STC393(1))
159 EQUIVALENCE (STB(401), STC401(1))
160 EQUIVALENCE (STB(409), STC409(1))
161 DATA SYN 1/ 0, 8, 20, 26
162 1, 31, 36, 43, 50/
163 DATA SYN 9/ 55, 62, 68, 82
164 1, 91, 98, 101, 104/
165 DATA SYN 17/ 111, 118, 125, 125
166 1, 125, 125, 125, 125/

```


57 INTEGER STC129(8)
58 INTEGER STC137(8)
59 INTEGER STC145(8)
60 INTEGER STC153(8)
61 INTEGER STC161(8)
62 INTEGER STC169(8)
63 INTEGER STC177(8)
64 INTEGER STC185(8)
65 INTEGER STC193(8)
66 INTEGER STC201(8)
67 INTEGER STC209(8)
68 INTEGER STC217(8)
69 INTEGER STC225(8)
70 INTEGER STC233(8)
71 INTEGER STC241(8)
72 INTEGER STC249(8)
73 INTEGER STC257(8)
74 INTEGER STC265(8)
75 INTEGER STC273(8)
76 INTEGER STC281(8)
77 INTEGER STC289(8)
78 INTEGER STC297(8)
79 INTEGER STC305(8)
80 INTEGER STC313(8)
81 INTEGER STC321(8)
82 INTEGER STC329(8)
83 INTEGER STC337(8)
84 INTEGER STC345(8)
85 INTEGER STC353(8)
86 INTEGER STC361(8)
87 INTEGER STC369(8)
88 INTEGER STC377(8)
89 INTEGER STC385(8)
90 INTEGER STC393(8)
91 INTEGER STC401(8)
92 INTEGER STC409(8)
93 EQUIVALENCE (SYM(1), SYN 1(1))
94 EQUIVALENCE (SYM(9), SYN 9(1))
95 EQUIVALENCE (SYM(17), SYN 17(1))
96 EQUIVALENCE (SYM(25), SYN 25(1))
97 EQUIVALENCE (SYM(33), SYN 33(1))
98 EQUIVALENCE (SYM(41), SYN 41(1))
99 EQUIVALENCE (SYM(49), SYN 49(1))
100 EQUIVALENCE (SYM(57), SYN 57(1))
101 EQUIVALENCE (SYM(65), SYN 65(1))
102 EQUIVALENCE (SYM(73), SYN 73(1))
103 EQUIVALENCE (SYM(81), SYN 81(1))
104 EQUIVALENCE (SYM(89), SYN 89(1))
105 EQUIVALENCE (SYM(97), SYN 97(1))
106 EQUIVALENCE (SYM(105), SYN 105(1))
107 EQUIVALENCE (SYM(113), SYN 113(1))
108 EQUIVALENCE (SYM(121), SYN 121(1))
109 EQUIVALENCE (STB(1), STC 1(1))
110 EQUIVALENCE (STB(9), STC 9(1))
111 EQUIVALENCE (STB(17), STC 17(1))

```

2      SUBROUTINE SYMBO(XA,YA,HI,ASC,TH,NC)
3 C
4 C  XA  STARTING X-COORD OF LOWER LEFT OF STRING (USER INCHES)
5 C  YA  STARTING Y-COORD OF LOWER LEFT OF STRING (USER INCHES)
6 C  HI  HEIGHT OF CHARACTERS IN STRING (USER INCHES)
7 C  ASC CHARACTER STRING
8 C  TH  ANGLE OF ORIENTATION (DEGREES)
9 C  NC  +N:  NUMBER OF CHARACTERS
10 C      -1:  PLOT ONLY SINGLE CHARACTER
11 C      -2:  DRAW LINE TO POINT AND PLOT SYMBOL
12 C
13 C  REV 08 FEB 82:  CHANGE FILE NAME TO 'SYMBOL'
14 C  REV 12 MAY 83:  SUBROUTINE NAME CHANGED TO 'SYMBO'
15 C                  CHANGE CALL TO SUBROUTINE 'PXPCG'
16 C  REV 11 JUL 83:  ADDED CHARACTER SIZE & DIRECTION CALLS
17 C                  :  ADDED CODING TO WRITE A NORMAL CHARACTER
18 C  REV 01 SEP 83:  DRAW CHARACTERS FOR THE HP-2648A GRAPHICS TERMINAL
19 C                  :  MODIFIED TO RUN ON THE FOURIER SYSTEM
20 C                  :  COMMON STATEMENT REMOVED
21 C                  :  A CALL TO SUBROUTINE 'PXPCO' ADDED
22 C
23      REAL ASC(1),RE(2)
24      INTEGER SYM(128), STB(416)
25      INTEGER SYN 1(8)
26      INTEGER SYN 9(8)
27      INTEGER SYN 17(8)
28      INTEGER SYN 25(8)
29      INTEGER SYN 33(8)
30      INTEGER SYN 41(8)
31      INTEGER SYN 49(8)
32      INTEGER SYN 57(8)
33      INTEGER SYN 65(8)
34      INTEGER SYN 73(8)
35      INTEGER SYN 81(8)
36      INTEGER SYN 89(8)
37      INTEGER SYN 97(8)
38      INTEGER SYN105(8)
39      INTEGER SYN113(8)
40      INTEGER SYN121(8)
41      INTEGER STC 1(8)
42      INTEGER STC 9(8)
43      INTEGER STC 17(8)
44      INTEGER STC 25(8)
45      INTEGER STC 33(8)
46      INTEGER STC 41(8)
47      INTEGER STC 49(8)
48      INTEGER STC 57(8)
49      INTEGER STC 65(8)
50      INTEGER STC 73(8)
51      INTEGER STC 81(8)
52      INTEGER STC 89(8)
53      INTEGER STC 97(8)
54      INTEGER STC105(8)
55      INTEGER STC113(8)
56      INTEGER STC121(8)

```

PAGE 1 FTN. OPTS: LXI 3:27 PM WED., 26 DEC., 1984

```
2      SUBROUTINE WHERE(XP, YP, SC)
3 C
4 C  XP PRESENT X COORDINATE (USER UNITS)
5 C  YP PRESENT Y COORDINATE (USER UNITS)
6 C  SC PRESENT SCALE FACTOR
7 C
8 C  REV 08 FEB 82:  CHANGE FILE NAME TO 'WHERE'
9 C
10     REAL RE(2)
11 C
12 C  GET PRESENT VALUES OF PX, PY, & SF
13     CALL PXPCO(1,LU,RE,OX,OY,SF,PX,PY)
14 C
15 C  GET X,Y VALUE IN USER INCHES & SCALE FACTOR
16     XP=PX
17     YP=PY
18     SC=SF
19     RETURN
20     END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 46 COMMON: (NONE)

```
2      SUBROUTINE FACTO(SC)
3 C
4 C      SC  SCALE FACTOR
5 C
6 C      REV 08 FEB 82:  CHANGE FILE NAME TO 'FACTOR'
7 C      REV 13 MAY 83:  CHANGE SUBROUTINE NAME TO 'FACTO'
8 C
9      REAL RE(2)
10 C
11 C      GET VALUE OF SF
12      CALL PXP00(1,LU,RE,OX,OY,SF,PX,PY)
13 C
14 C
15 C      UPDATE SCALE FACTOR.  (CONVERT USER UNITS TO MACHINE INCHES)
16      IF(SC. GT. 0.)SF=SC*SF
17      IF(SC. EQ. 1.)SF=1.
18 C
19 C      SAVE NEW VALUE OF SF
20      CALL PXP00(0,LU,RE,OX,OY,SF,PX,PY)
21      RETURN
22      END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 66 COMMON: (NONE)

PAGE 1 FTN. OPTS: LXI 3:35 PM WED., 26 DEC., 1984

```
2 SUBROUTINE PXPCO(JST,LU,RE,OX,OY,SF,PX,PY)
3 REAL RE(2),VARS(7)
4 C
5 C JST - 0: STORE VALUES IN ARRAY VARS
6 C - 1: RETREIVE VALUES FROM ARRAY VARS
7 C
8 C STORE VALUES
9 IF(JST.NE.0) GO TO 10
10 IUNIT=LU
11 VARS(1)=RE(1)
12 VARS(2)=RE(2)
13 VARS(3)=OX
14 VARS(4)=OY
15 VARS(5)=SF
16 VARS(6)=PX
17 VARS(7)=PY
18 RETURN
19 C
20 C UPDATE VALUES
21 C
22 10 LU=IUNIT
23 RE(1)=VARS(1)
24 RE(2)=VARS(2)
25 OX=VARS(3)
26 OY=VARS(4)
27 SF=VARS(5)
28 PX=VARS(6)
29 PY=VARS(7)
30 RETURN
31 END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 104 COMMON: (NONE)

PAGE 3 PLOT OPTS: LXI

3:26 PM WED., 26 DEC., 1984

```
112      WRITE(LU,520) IEAND,LP5,IDSP,IEAND,LP5,LU0,ICSP
113      WRITE(LU,520) IESTR,LDR
114 520    FORMAT(7R2)
115 C
116 C      STORE VALUES
117 700    CALL PXPC0(0,LU,RE,OX,OY,SF,PX,PY)
118 C
119      RETURN
120      END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 390 COMMON: (NONE)

```
57 C      PEN DOWN, DRAW LINE
58 100     CONTINUE
59 C      IF<LU.EQ.1> GO TO 115
60        WRITE<LU,110> IX,IY
61 110     FORMAT("PD;PA",I6,"",I6)
62        GO TO 120
63 115     WRITE<LU,116> IESTR,ILPLB,IX,IY,IZSP
64 116     FORMAT(2R2,I6,"",I6,R2)
65 120     CONTINUE
66        PX=XA
67        PY=YA
68 C
69 C      DEFINE NEW ORIGIN IN MACHINE INCHES IF REQUESTED
70        IF <IA. GT. 0> GO TO 700
71        PX=0.0
72        PY=0.0
73        OX=AV1
74        OY=AV2
75        GO TO 700
76 C
77 C      PEN UP, MOVE TO NEXT X, Y COORDINATE
78 200     CONTINUE
79 C      IF<LU.EQ.1> GO TO 220
80        WRITE<LU,210> IX,IY
81 210     FORMAT("PU;PA",I6,"",I6)
82        GO TO 120
83 220     WRITE<LU,230> IESTR,ILPLA,IX,IY,IZSP
84 230     FORMAT(2R2,I6,"",I6,R2)
85        GO TO 120
86 C
87 C      END OF PLOTS
88 C
89 600     CONTINUE
90        IF<LU.NE.1> GO TO 700
91 C
92 C      RESET TERMINAL
93        WRITE<LU,520> IESCG
94        GO TO 700
95 C
96 500     CONTINUE
97        IF<LU.EQ.1> GO TO 510
98 C
99 C      ADVANCE THE PAPER ON THE HP9872T PLOTTER
100 C
101 C      FULL PAGE ADVANCE
102        IF<IPAGE.EQ.10> CALL HPPAG(1)
103 C
104 C      HALF PAGE ADVANCE
105        IF<IPAGE.LT.0> CALL HPPAG(2)
106        GO TO 700
107 C
108 510     CONTINUE
109 C
110 C      HARD COPY, CLEAR SCREEN (GRAPHIC DISPLAY)
111 C
```

```

2      SUBROUTINE PLOT(XA,YA,IA)
3 C
4 C      XA  X COORDINATE (USER UNITS)
5 C      YA  Y COORDINATE (USER UNITS)
6 C      IA  PEN CONTROL
7 C          +999 END OF PLOTS
8 C          +11 END OF PLOTS ( RESET TERMINAL - FIRST PRESS )
9 C          +10 HARD COPY, CLEAR SCREEN (TERMINAL)
10 C          +10 ADVANCE PAPER ONE FULL PAGE
11 C          -10 ADVANCE PAPER ONE HALF PAGE
12 C          +3 MOVE TO (XA, YA) PEN UP
13 C          +2 MOVE TO (XA, YA) PEN DOWN
14 C          -2 MOVE TO (XA, YA) PEN DOWN SET ORIGIN TO (XA, YA)
15 C          -3 MOVE TO (XA, YA) PEN UP   SET ORIGIN TO (XA, YA)
16 C
17 C          ANY OTHER VALUE OF IA IS TREATED AS A NOP
18 C
19 C      REV 02 FEB 82: CHANGE FILE NAME TO 'PLOT'
20 C      REV 22 JUN 83: SUPPORT HP-9872T PLOTTER
21 C      REV 01 SEP 83: SUPPORT HP-2648A GRAPHICS TERMINAL
22 C                      : MODIFIED TO RUN ON THE FOURIER SYSTEM
23 C                      :   COMMON STATEMENT REMOVED
24 C                      :   CALLS TO SUBROUTINE 'PXPCO' ADDED
25 C
26      INTEGER IA, IC0(6)
27      REAL AV(2),RE(2)
28      EQUIVALENCE (AV(1), AV1), (AV(2), AV2)
29      DATA N00/6/, IC0/2,3, -2, -3, 10, 11/
30      DATA IESTR/015452B/, ILPLA/070141B/, ILPLB/070142B/
31      DATA IXSP/055040B/, LDA/062101B/, ICSP/041440B/
32      DATA LU0/072460B/, IEAND/015446B/, LP5/070065B/
33      DATA IDSP/042040B/, IESCG/015547B/, IZSP/055040B/
34 C
35 C      RETREIVE VALUES
36      CALL PXPCO(1,LU,RE,OX,OY,SF,PX,PY)
37 C
38 C      CONVERT FROM USER UNITS TO MACHINE INCHES AND UNITS
39      IE=0
40      I0=IA
41      IPAGE=I0
42      IF(I0.EQ.-10) I0=10
43      IF (I0. EQ. 999) I0=11
44      AV1=SF*XA+OX
45      AV2=SF*YA+OY
46      X=AV1/RE(1)
47      IX=X+.5
48      Y=AV2/RE(2)
49      IY=Y+.5
50 C
51 C      IDENTIFY PEN CONTROL OPTION
52      DO 30 I1=1, N00
53      IF (I0. EQ. IC0(I1)) GO TO (100, 200, 100, 200, 500, 600), I1
54 30  CONTINUE
55      GO TO 700
56 C

```



```

2      SUBROUTINE NUMBE (X, Y, HGHT, Z, T, N)
3 C
4 C      X,Y      COORDINATES OF THE LOWER LEFT CORNER OF THE FIRST
5 C              DIGIT OF OUTPUT.  X,Y IS IN FLT. PT. (USER INCHES)
6 C      HGHT     HEIGHT OF THE PLOTTED NUMBER IN FLT. PT. (USER INCHES)
7 C      Z        FLT. PT. NUMBER TO BE PLOTTED
8 C      T        ORIENTATION ANGLE FOR THE NUMBER
9 C      N        NUMBER OF DECIMAL DIGITS FOR OUTPUT
10 C             N=-1 WILL SUPPRESS THE DECIMAL POINT
11 C
12 C      REV 08 FEB 82:  CHANGE FILE NAME TO 'NUMBER'
13 C      REV 08 FEB 82:  FIX CALC OF FPN WHEN N. GE. 0
14 C      REV 12 MAY 83:  CHANGE SUBROUTINE NAME TO 'NUMBE'
15 C      REV 12 MAY 83:  CHANGE CALL TO SUBROUTINE 'SYMB0'
16 C      REV 26 JUL 83:  CHANGED 'ALOG10' TO 'ALOGT'
17 C
18      FPN=ABS(Z)
19      IF (N.GE.0) FPN=FPN+.5*10.**(-N)
20      XT=X
21      YT=Y
22      IF (Z) 10, 90, 20
23 C
24 C      DRAW MINUS SIGN FOR NEGATIVE NUMBER
25 10    CALL SYMB0 (XT, YT, HGHT, 1H-, T, 1)
26      CALL WHERE (XT, YT, 2T)
27 C
28 C      GET NO. OF DIGITS TO LEFT OF DECIMAL POINT
29 20    I=ALOGT(FPN)+1.0000001
30      IF (I) 50, 50, 30
31 C
32 C      DRAW DIGITS TO LEFT OF DEC. PT.
33 30    DO 40 J = 1, I
34        K = FPN*10.0**(J-I)
35        CALL SYMB0 (XT, YT, HGHT, FLOAT (K+48), T, -1)
36        FPN = FPN - FLOAT (K*10**(I-J))
37 40    CALL WHERE(XT,YT,2T)
38 C
39 C      DRAW DECIMAL POINT IF REQUESTED
40      IF (N+1) 80, 80, 50
41 50    CALL SYMB0 (XT, YT, HGHT, 1H., T, 1)
42      CALL WHERE (XT, YT, 2T)
43 C
44 C      DRAW DIGITS TO RIGHT OF DECIMAL POINT IF REQUESTED
45      IF (N) 80, 80, 60
46 60    DO 70 IJ=1, N
47        K=FPN*10.0
48        CALL SYMB0 (XT, YT, HGHT, FLOAT (K+48), T, -1)
49        CALL WHERE (XT, YT, 2T)
50 70    FPN=FPN*10.0-FLOAT(K)
51 80    RETURN
52 C
53 C      SPECIAL CASE IF NUMBER = 0.0
54 90    CALL SYMB0 (XT, YT, HGHT, 12H0.0000000000, T, 2+N)
55      RETURN
56      END

```

PAGE 2 NUMBE OPTS: LXI

3:29 PM WED., 26 DEC., 1984

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 241 COMMON: (NONE)

```

2      SUBROUTINE SCALE (X, S, N, K)
3
4 C
5 C      X  ARRAY OF DATA TO BE SCANNED FOR MAXIMUM AND MINIMUM
6 C      VALUES. ADJUSTED MINIMUM VALUE STORED IN X(N*K+1).
7 C      ADJUSTED DX(MAX-MIN) STORED IN X(N*K+K+1).
8 C      S  LENGTH OVER WHICH THIS DATA IS TO BE PLOTTED. (MACHINE INCHES)
9 C      N  NUMBER OF DATA POINTS IN THE ARRAY X.
10 C     K  REPEAT CYCLE OF MIXED ARRAY (NORMALLY 1).
11 C
12 C     REV 26 JUL 83:  CHANGED 'ALOG10' TO 'ALOGT'
13 C
14     REAL X(1), XM(5)
15     DATA XM/2.0, 4.0, 5.0, 8.0, 10.0/
16 C
17 C     GET SIZE OF INPUT MATRIX
18     NP=N*K
19     L=NP+1
20     J=L+K
21 C
22 C     GET MIN, MAX VALUES IN X ARRAY
23     XMAX=X(1)
24     XMIN=XMAX
25     DO 100 I=1, NP, K
26     XI=X(I)
27     XMAX=AMAX1(XMAX, XI)
28 100  XMIN=AMIN1(XMIN, XI)
29     IF (S.LE.0.0) GO TO 210
30 C
31 C     GET RATIO OF USER RANGE/AXIS LENGTH (USER UNITS)
32     DX=(XMAX-XMIN)/S
33     IF (DX.LE.0.0) GO TO 210
34 C
35 C     ROUND MINIMUM AXIS VALUE TO A CONVENIENT NUMBER
36     IDX=ALOGT(DX)
37     XI=10.0**IDX
38     IF (XMIN)110, 140, 120
39 110  XMIN=IFIX(XMIN-1.0)
40     XI=XI-0.9999
41 120  XMIN=IFIX(XMIN-XI)
42     XMIN=XMIN*XI
43 140  X(L)=XMIN
44 C
45 C     ROUND TIC DISTANCE TO A CONVENIENT NUMBER
46     T=((XMAX-XMIN)/S)
47     IF (T.LE.0.0) GO TO 210
48     DX=ALOGT(T)
49     IDX=DX
50     XMAX=1.0
51     DX=10.0** (DX-IDX)
52 150  IF (DX-1.0) 160, 200, 170
53 160  DX=10.0*DX
54     IDX=IDX-1
55     GO TO 150
56 170  DO 180 I=1,5

```

PAGE 2 SCALE OPTS: LXI

3:29 PM WED., 26 DEC., 1984

```
57      XI=XM(I)
58      IF(DX.LE.XM(I)) GO TO 190
59 180   CONTINUE
60 190   XMAX=XI
61 200   X(J)=XMAX*10.0**IDX
62      RETURN
63 C
64 C      UNSCALABLE - SET STARTING POINT IN X(L), TIC DIST=1 IN X(J)
65 210   X(J)=1.0
66      X(L)=XMIN-0.5
67      RETURN
68      END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 285 COMMON: (NONE)

```

2      SUBROUTINE AXIS (X0, Y0, A0, N0, S0, T0, C0, D0)
3
4 C
5 C      X0  X COORDINATE OF START OF AXIS (USER INCHES)
6 C      Y0  Y COORDINATE OF START OF AXIS (USER INCHES)
7 C      A0  CHARACTER STRING TO DESCRIBE AXIS (MSB,LSB)
8 C      N0  NUMBER OF CHARACTERS IN STRING
9 C          - ON CLOCKWISE SIDE OF AXIS (NORMAL FOR X)
10 C         + ON COUNTER CLOCKWISE SIDE OF AXIS (NORMAL FOR Y)
11 C      S0  LENGTH OF AXIS (USER INCHES)
12 C      T0  ANGLE OF AXIS TO X AXIS OF PAPER (DEGREES)
13 C          0.0 FOR X-AXIS
14 C          90.0 FOR Y-AXIS
15 C      C0  COORDINATE OF MINIMUM TICK ON AXIS (PROBLEM UNITS)
16 C          NORMALLY PROVIDED BY 'SCALE', FOLLOWING THE LAST POINT
17 C          IN THE DATA ARRAY TO BE PLOTTED
18 C      D0  DISTANCE BETWEEN TICKS (PROBLEM UNITS)
19 C          NORMALLY PROVIDED BY 'SCALE', FOLLOWING C0
20 C
21 C  REV 08 FEB 82:  CHANGE NAME TO 'AXIS'
22 C  REV 13 MAY 83:  CHANGE CALLS TO SUBROUTINES NUMBE, SYMB0
23 C  REV 01 SEP 83:  CHANGE CHARACTER SIZE FOR HP-2648A GRAPHICS TERMINAL
24 C
25      REAL A0(1),RE(2)
26 C
27 C      RETREIVE VALUES
28      CALL PXP00(1,LU,RE,OX,OY,SF,PX,PY)
29 C
30 C
31      N1=IABS(N0)
32      N2=S0+0.50
33      B1=0.5*S0-.06*FLOAT(N1+7)
34      B2=0.12*FLOAT(N1+1)
35 C
36 C      CONVERT DEGREES TO RADIANS & SET UP COORD ROTATION
37      T1=T0*0.017453294
38      T3=COS(T1)
39      T4=SIN(T1)
40      IF(N0.LT.0)GO TO 10
41      B3=0.3675
42      B4=0.18
43      T2=T0
44      T5=0.1
45      GO TO 20
46 10    B3=-.4375
47      B4=-0.25
48      T2=T0
49      T5=-.1
50 C
51 C      GET X,Y COMPONENTS OF TIC MARK & START POINT
52 20    T6=T5*T3
53      T5=T5*T4
54      X1=X0
55      Y1=Y0
56 C

```

```

57 C    DRAW TIC MARK AND NEXT SEGMENT OF AXIS
58 C
59      DO 100 I=1,N2
60      X2=X1-T5
61      Y2=Y1+T6
62      CALL PLOT (X2, Y2, 3)
63      CALL PLOT (X1, Y1, 2)
64      X1=X1+T3
65      Y1=Y1+T4
66 100   CALL PLOT (X1, Y1, 2)
67 C
68 C    DRAW LAST TIC MARK
69      X2=X1-T5
70      Y2=Y1+T6
71      CALL PLOT (X2, Y2, 2)
72 C
73 C    GET VALUES FOR TIC LABELS:  DIFF, END, EXPONENT
74      D1=D0
75      C1=C0+N2*D1
76      E1=0.0
77      IF (D1.EQ.0.0) GO TO 140
78 C
79 C    CHANGE EXPONENT IF VALUE IS GREATER THAN 100
80 110   IF(D1.LT.100.0) GO TO 130
81      D1=D1*0.1
82      C1=C1*0.1
83      E1=E1+1.0
84      GO TO 110
85 120   D1=D1*10.0
86      C1=C1*10.0
87      E1=E1-1.0
88 C
89 C    CHANGE EXPONENT IF VALUE IS LESS THAN .01
90 130   IF(D1.LT.0.01) GO TO 120
91 C
92 C    LAST TIC + DISTANCE AWAY FROM AXIS + 1 CHAR TO LEFT
93 140   X2=X1-B4*T4-.0857*T3
94      Y2=Y1+B4*T3-.0857*T4
95      N2=N2+1
96 C
97 C
98 C    DEFINE HEIGHT OF CHARACTERS
99      HIGHT=0.10
100 C
101 C    CHANGE CHARACTER SIZE FOR THE TERMINAL
102      IF(LU.EQ.1) HIGHT=0.15
103 C
104 C    LABEL EACH TIC MARK
105 C
106      DO 150 I=1, N2
107      CALL NUMBE (X2, Y2, HIGHT, C1, T2, 2)
108      C1=C1-D1
109      X2=X2-T3
110 150   Y2=Y2-T4
111 C

```

```

112 C    WRITE LABEL FOR AXIS
113      X2=X0+B1*T3-B3*T4
114      Y2=Y0+B1*T4+B3*T3
115      CALL SYMB0 (X2, Y2, HIGHT, A0, T2, N1)
116 C
117 C    WRITE EXPONENTIAL SCALE FACTOR IF REQUIRED
118      IF (E1.EQ.0.0) RETURN
119      X2=X2+B2*T3
120      Y2=Y2+B2*T4
121      IF (T2.EQ.0.0 .AND. LU.EQ.1) X2=X2+.10
122      IF (T2.EQ.90.0 .AND. LU.EQ.1) Y2=Y2+.10
123      CALL SYMB0 (X2, Y2, HIGHT, 6H(X10) , T2, 6)
124      X2=X2+.48*T3-.07*T4
125      Y2=Y2+.48*T4+.07*T3
126      IF (T2.EQ.0.0 .AND. LU.EQ.1) X2=X2+.20
127      IF (T2.EQ.90.0 .AND. LU.EQ.1) Y2=Y2+.20
128      CALL NUMBE (X2, Y2, HIGHT, E1, T2, -1)
129      RETURN
130      END

```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 647 COMMON: (NONE)

```

2      SUBROUTINE LINE(X, Y, N, K, J, L)
3 C
4 C      X   ARRAY OF ABSCISSA VALUES (USER UNITS)
5 C      Y   ARRAY OF ORDINATE VALUES (USER UNITS)
6 C      N   NUMBER OF POINTS IN THE ARRAY
7 C      K   REPEAT CYCLE OF A MIXED ARRAY (NORMALLY = 1)
8 C      J   >0, SYMBOL AND LINE
9 C          =0, LINE ONLY
10 C      <0, SYMBOL ONLY
11 C      L   NUMBER OF SYMBOL, SEE SYMBOL ROUTINE FOR LIST
12 C          0-17 ARE CENTERED SPECIAL SYMBOLS
13 C
14 C      REV 08 FEB 82:  FILE NAME CHANGED TO 'LINE'
15 C      REV 13 MAY 83:  CHANGE CALL TO SUBROUTINE 'SYMBOL'
16 C      THIS ROUTINE EXPECTS XMIN, DX, YMIN AND DY TO BE STORED IN
17 C      X(N*K+1), X(N*K+1+K), Y(N*K+1), AND Y(N*K+1+K) RESPECTIVELY
18 C
19      REAL X(1), Y(1)
20      IF (N.LT. 1) GO TO 110
21 C
22 C      CHECK FOR VALID SYMBOL
23      AL=L
24      IF(AL.LE.0.0 .OR. AL.GT.127.) AL=0.0
25 C
26 C      GET START POINT, SCALING, END OF DATA
27      I0=N*K+1
28      I1=I0+K
29      I2=I0-K
30      XMIN=X(I0)
31      DX=X(I1)
32      YMIN=Y(I0)
33      DY=Y(I1)
34 C
35 C      SET UP INDICES AND FLAGS
36      I2=1
37      I3=3
38      IF(J.GE.0) I3=2
39      I4=3
40      I5=N
41 C
42 C      CONVERT NEXT X,Y LOCATION TO USER INCHES & MOVE PEN
43 100  X1=(X(I2)-XMIN)/DX
44      Y1=(Y(I2)-YMIN)/DY
45      CALL PLOT (X1, Y1, I4)
46      I4=I3
47 C
48 C      PLOT SYMBOL IF REQUESTED
49      IF (J.NE.0) CALL SYMB0 (X1, Y1, 0.14, AL, 0.0, -1)
50      I2=I2+K
51      I5=I5-1
52      IF (I5.GT.0) GO TO 100
53 110  RETURN
54      END

```


PAGE 2 LINE OPTS: LXI

3:30 PM WED., 26 DEC., 1984

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 178 COMMON: (NONE)

```

2      SUBROUTINE PXPCG (I0, I1, I2)
3 C
4 C      THIS ROUTINE EXTRACTS CHARACTER #I1 FROM STRING I0
5 C      (RHS FIRST, LHS SECOND)
6
7 C
8 C      REV 08 FEB 82:  CHANGE FILE NAME TO 'PXPCGT'
9 C      REV 12 MAY 83:  SUBROUTINE NAME CHANGED TO 'PXPCG'
10 C
11      INTEGER I0 (1), I1, I2
12 C
13 C      GET INDEX -1 OF WORD CONTAINING CHAR
14      JW=(I1-1)/2
15 C
16 C      WITHIN WORD INDEX OF DESIRED CHAR (1 OR 2)
17      JB=I1-JW-JW
18 C
19 C      PULL TWO CHARACTERS FROM STRING
20      JW=I0(JW+1)
21 C
22 C      SHIFT FROM LHS IF SECOND CHARACTER IS DESIRED
23      IF (JB.NE.1) JW=JW/2**8
24 C
25 C      RETURN DESIRED CHAR IN RHS OF WORD
26      I2=IAND(JW, 255)
27      RETURN
28      END

```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 52 COMMON: (NONE)

AGE 1 FTH. OPTS: LMI 3:31 PM WED., 26 DEC., 1984

```
2      SUBROUTINE CGET(I0,I1,I2)
3 C
4 C      THIS ROUTINE EXTRACTS CHARACTER #I1 FROM STRING I0
5 C      (LHS FIRST, RHS SECOND)
6 C
7 C      REV 08 FEB 82:  CHANGE FILE NAME TO 'CGET'
8 C
9      INTEGER I0 (1), I1, I2
10     JW=(I1-1)/2
11     JB=I1-JW-JW
12     JW=I0-JW+1
13     IF(JB.NE.2) JW=JW-2**8
14     I2=IAND(JW,255)
15     RETURN
16     END
```

FTH4 COMPILE: HP92334 REV.2226 (820503)

++ NO WARNINGS ++ NO ERRORS ++ PROGRAM: 52 COMMON: (NONE)

GE 1 FTH. OPTS: LXI 3:31 PM WED., 26 DEC., 1984

```
2      SUBROUTINE HPCDR(TH)
3 C
4 C      THIS ROUTINE SPECIFIES THE ABSOLUTE DIRECTION IN
5 C      WHICH CHARACTERS ARE LETTERED
6 C
7 C      TH - ANGLE BETWEEN CHARACTER BASE AND MACHINE X AXIS (DEGREES)
8 C
9      INTEGER ICHAR(10)
10 C
11 C      DEFINE ABSOLUTE CHARACTER DIRECTION COMMAND
12      CALL HPOUT(1HD)
13      CALL HPOUT(1HI)
14 C
15 C      SEND RUN VALUE
16      RUN=COS(TH*.0174532925)
17      CALL FP2AS(RUN,10,ICAR,N)
18      N=MIN0(N+4,10)
19      DO 100 I=1,N
20 100   CALL HPOUT(ICAR(I))
21 C
22      CALL HPOUT(1H,>)
23 C
24 C      SEND RISE VALUE
25      RISE=SIN(TH*.0174532925)
26      CALL FP2AS(RISE,10,ICAR,N)
27      N=MIN0(N+4,10)
28      DO 200 I=1,N
29 200   CALL HPOUT(ICAR(I))
30 C
31      CALL HPOUT(1H;>)
32 C
33      RETURN
34      END
```

IN4X COMPILER: HP92834 REV.2226 (820503)

↔ NO WARNINGS ↔ NO ERRORS ↔ PROGRAM: 118 COMMON: (NONE)

1 FTN. OPTS: LXI 3:32 PM WED., 26 DEC., 1984

```
2 SUBROUTINE HPOSZ(W,H)
3 C
4 C THIS ROUTINE SPECIFIES THE SIZE OF CHARACTERS & SYMBOLS
5 C
6 C W - WIDTH OF CHARACTER IN INCHES
7 C H - HEIGHT OF CHARACTER IN INCHES
8 C
9 C INTEGER ICHAR(10)
10 C
11 C DEFINE CHARACTER SIZE COMMAND
12 C CALL HPOUT(1HS)
13 C CALL HPOUT(1HI)
14 C
15 C CONVERT TO CM & SEND WIDTH VALUE TO PLOTTER
16 C CALL FF2AS(W*2.54,10,ICAR,N)
17 C N=MIN0(N+4,10)
18 C DO 100 I=1,N
19 C CALL HPOUT(ICAR(I))
20 C
21 C CALL HPOUT(1H, )
22 C
23 C SEND HEIGHT VALUE
24 C CONVERT TO CM & SEND HEIGHT VALUE TO PLOTTER
25 C CALL FF2AS(H*2.54,10,ICAR,N)
26 C N=MIN0(N+4,10)
27 C DO 200 I=1,N
28 C CALL HPOUT(ICAR I)
29 C
30 C CALL HPOUT(1H)
31 C RETURN
32 C END
```

491 COMPILER: HP82304 PE 10208 1020500

* NO WARNINGS ** NO ERRORS ** PROGRAM: 113 COMMON: (NONE)

1 FTH. OPTS: LNI 3:32 PM WED., 26 DEC., 1984

SUBROUTINE HPOUT(ICHAR)

```
C
C THIS ROUTINE SENDS OUTPUT TO THE HP-9872T PLOTTER
C
C ICHAR - CHARACTER TO OUTPUT TO PLOTTER
C
C REV 01 SEP 83: MODIFIED TO RUN ON THE FOURIER SYSTEM
C : COMMON STATEMENT REMOVED
C : A CALL TO SUBROUTINE 'PXPCO' ADDED
C
REAL RE(2)
INTEGER IC(100)
DATA ITEM/035440B/
C
C GET UNIT NUMBER
CALL PXPCO(1,LU,RE,OX,OY,SF,PI,PY)
C
C SAVE CHARACTERS FOR OUTPUT TO PLOTTER
I=I+1
N=I
IC(I)=ICHAR
C
C CHECK FOR TERMINATOR
IF(ICHAR.EQ. ITEM) I=0
IF(I.NE.0) RETURN
C
C OUTPUT CHARACTERS TO PLOTTER
C
IEND=N-1
WRITE(LU,130) (IC(J),J=1,IEND)
: 130 FORMAT(100A1)
C
C SEND PEN UP COMMAND TO PLOTTER
WRITE(LU,150)
: 150 FORMAT("PU")
C
RETURN
END
```

FX COMPILER: HP92834 REV.2226 (820503)

NO WARNINGS ** NO ERRORS ** PROGRAM: 204 COMMON: (NONE)

DF UPDAT-7K02

1	ISSR	%4SYLB	Y	0
2	Y7001	%Y7001	Y	0
5	HPPEN	%PLTPK	Y	0
7	WHERE	%PLTPK	Y	0
4	PXPCG	%PLTPK	Y	0
4	CGET	%PLTPK	Y	0
1	FACT0	%PLTPK	Y	0
3	HPCS2	%PLTPK	Y	0
0	HPCDR	%PLTPK	Y	0
1	HPPAG	%PLTPK	Y	0
6	PXPC0	%PLTPK	Y	0
3	LINE	%PLTPK	Y	0
3	HPQUT	%PLTPK	Y	0
6	PLOTS	%PLTPK	Y	0
0	FP2AS	%PLTPK	Y	0
7	NUMBE	%PLTPK	Y	0
5	SCALE	%PLTPK	Y	0
7	PLOT	%PLTPK	Y	0
5	AXIS	%PLTPK	Y	0
2	SYMB0	%PLTPK	Y	0
7	Y9000	%Y9000	Y	0

RESS	PGMHAM	LIBNAM	CONTROL	LENGTH
42	AXIS	%PLTPK	Y	01265
27	Y7001	%Y7001	Y	00042
71	ISSR	%4SYLB	Y	00007
00	Y9000	%Y9000	Y	02237
37	PLOT	%PLTPK	Y	00617
56	SCALE	%PLTPK	Y	00475
53	HPPAG	%PLTPK	Y	00201
54	HPPEN	%PLTPK	Y	00056
32	SYMB0	%PLTPK	Y	02012
44	NUMBE	%PLTPK	Y	00377
43	FP2AS	%PLTPK	Y	00370
33	PLOTS	%PLTPK	Y	00336
71	HPQUT	%PLTPK	Y	00313
04	CGET	%PLTPK	Y	00074
00	LINE	%PLTPK	Y	00273
73	PXPC0	%PLTPK	Y	00256
51	HPCDR	%PLTPK	Y	00170
41	HPCS2	%PLTPK	Y	00163
24	FACT0	%PLTPK	Y	00111
35	PXPCG	%PLTPK	Y	00074
31	WHERE	%PLTPK	Y	00057
10				

COER T=00004 IS ON CR00022 USING 00006 BLAS R=0000

```
001 00
002 A,OVRLYN      *OMV06A* 54451-14805 REV. A 06 OCT 83
003 T,SNP510     BASE COMMAND FILE FOR USER OVERLAY GENERATION
004              INSERT Y COMMAND NUMBERS BEFORE *0E*. AN EXAMPLE:
005              *0,0077* , WHERE *0077*=4-DIGIT Y COMMAND NUMBER
006 0,7001
007 0,9000
008 0E
009
010              CSORT+
011              INSERT PROGRAM LOADS BETWEEN *CSORT+* AND *CSORT-*.
012              EXAMPLE: *F,Y77JOB* , WHERE *Y77JOB* = FILE NAME
013                      *Y,Y0077* , WHERE *Y0077* = PROG NAME
013 F,%Y7001
014 Y,Y7001
015 F,%Y9000
016 Y,Y9000
017 F,%PLTPK
018 Y,AXIS
019 F,%PLTPK
020 Y,SCALE
021 F,%PLTPK
022 Y,LINE
023 F,%PLTPK
024 Y,PLOTS
025 F,%PLTPK
026 Y,PLOT
027 F,%PLTPK
028 Y,HPPAG
029 F,%PLTPK
030 Y,NUMBE
031 F,%PLTPK
032 Y,SYMB0
033 F,%PLTPK
034 Y,PXPC0
035 F,%PLTPK
036 Y,FACT0
037 F,%PLTPK
038 Y,HPCDF
039 F,%PLTPK
040 Y,HPOUT
041 F,%PLTPK
042 Y,HPPEN
043 F,%PLTPK
044 Y,PXPCG
045 F,%PLTPK
046 Y,WHERE
047 F,%PLTPK
048 Y,CGET
049 F,%PLTPK
050 Y,HPCSZ
051 F,%PLTPK
052 Y,FP2AS
053 F,%4SYLB
054 Y,ISSF
055
056 F,N3500A
057 L,**
058 F,N3501A
059 L,**
060 F,A3060B
061 L,**
062 U,**
063 E,01
064 ::

CSORT-
```

LISTINGS OF THE COMMAND AND THE OVERLAY GENERATION
OF THE GENERAL PLOT PACKAGE EVALUATION PROGRAM Y9000

DATA AND PLOT PRODUCED BY PROGRAM Y9000



PAGE 0004 FTH. 10:58 AM THU., 27 DEC., 1984

0113 END#

PAGE 0003 Y9000 10:58 AM THU., 27 DEC., 1984

0111 C

0112 END

FTN4 COMPILER: HP92060-16092 REV. 2026 (800423)

** NO WARNINGS ** NO ERRORS ** PROGRAM = 01183 COMMON = 00000

```

0056 C
0057 C   DEFINE FOURIER DATA IN BLOCK ZERO
0058 C   CALL KYBD(2HBS,IBS)
0059 C   CALL KYBD(2HCL,IBLON)
0060 C   CALL KYBD(2HRA)
0061 C
0062 C   GET SYSTEM BLOCK SIZE
0063 C   CALL GETQ(IBLOK,NQUAL)
0064 C   IF(NQUAL(5).NE.0) WRITE(6,30) (NQUAL(J),J=1,5)
0065 30  FORMAT("ERROR", 5(I6,4X))
0066 C   BS=NQUAL(1)
0067 C
0068 C   PUT FOURIER DATA INTO X,Y ARRAYS
0069 C   DO 5 I=1,BS
0070 C     I1=I-1
0071 C     CALL GET(IBLOK,I1,DATA1,DATA2)
0072 C     Y(I)=DATA1
0073 C     CALL KYBD(2HY ,1800,1,I1)
0074 C     CALL KYBD(2HY ,1828,2000,1,IBLOK,1)
0075 C     CALL VGETF(2000,IBUF)
0076 C     X(I)=XX
0077 5   CONTINUE
0078 C
0079 C   MANUALLY LOAD PAPER ON THE PLOTTER
0080 C   IF(IPAG.EQ.2 .AND. LU.EQ.30) CALL HPPAG(3)
0081 C
0082 C   PLOT THE DATA
0083 C
0084 C   TURN ON BITS 0-5 OF S-REG TO SIGNAL START OF OPERATION
0085 C   SOME OF THESE BITS WILL BE TURNED OFF DURING THE OPERATION.
0086 C   ALL BITS ON EXCEPT 0-5 - SIGNALS COMPLETION OF PLOT OPERATION.
0087 C
0088 C   CALL ISSR(77B)
0089 C   CALL PLOT(1.0,1.0,-3)
0090 C   CALL SCALE(X,10.0,BS,1)
0091 C   CALL SCALE(Y,2.0,BS,1)
0092 C   CALL LINE(X,Y,BS,1,0,0)
0093 C
0094 C   DRAW AND LABEL AXES
0095 C
0096 C   TURN ON BITS 0-1 OF S-REG TO SIGNAL START OF OPERATION
0097 C   CALL ISSR(7B)
0098 C   CALL AXIS(0.0,0.0,8HABSCISSA,-8,10.0,0.0,X(BS+1),X(BS+2))
0099 C   CALL AXIS(0.0,0.0,8HORDINATE,+8,6.0,90.0,Y(BS+1),Y(BS+2))
0100 C   TURN OFF BITS 0-1 OF S-REG TO SIGNAL END OF AXES OPERATION
0101 C   CALL ISSR(0)
0102 C
0103 C   SIGNAL END OF PLOT OPERATION
0104 C   CALL ISSR(177700B)
0105 C
0106 C   GET A HARDCOPY
0107 C   CALL PLOT(0.0,0.0,1P)
0108 C
0109 C   RESET TERMINAL
0110 C   CALL PLOT(0.0,0.0,11)

```

```

0001 FTN4,L
0002 SUBROUTINE Y9000
0003 C
0004 C THIS ROUTINE PROVIDES A MEANS OF EVALUATING THE
0005 C GENERAL PLOT SUBROUTINE PACKAGE ON THE FOURIER SYSTEM.
0006 C
0007 REAL X(130),Y(130)
0008 INTEGER NQUAL(5),IBUF(2),BS
0009 EQUIVALENCE(XX,IBUF)
0010 DATA IBELL/3400B/
0011 C
0012 IBLOK=0
0013 IBS=128
0014 C
0015 C CLEAR SCREEN AND CLEAR S-REGISTER
0016 CALL Y7001
0017 CALL ISSR(0)
0018 C
0019 C REQUEST INFORMATION FROM USER
0020 C
0021 WRITE(1,10) IBELL
0022 10 FORMAT(R2,/"INPUT PLOT DEVICE UNIT NUMBER (12 FORMAT)"/)
0023 READ(1,15) LU
0024 15 FORMAT(I2)
0025 WRITE(1,18) IBELL
0026 18 FORMAT(R2,/"THE PLOT PACKAGE SETS THE SCALE FACTOR TO ONE,"/
0027 *"A FULL PAGE IS ADVANCED AND PEN NUMBER ONE IS",/
0028 *"SELECTED FOR THE PLOTTER.")
0029 WRITE(1,20)
0030 20 FORMAT(/"THESE FEATURES MAY BE CHANGED PROGRAMMATICALLY",/
0031 *"INPUT THE INFORMATION REQUESTED. ")
0032 WRITE(1,26)
0033 26 FORMAT(/"ARE CHANGES DESIRED? ENTER 0 FOR NO; 1 FOR YES")
0034 READ(1,24) ICHG
0035 24 FORMAT(I1)
0036 IF(ICHG.EQ.0) GO TO 1
0037 WRITE(1,21)
0038 21 FORMAT("INPUT DESIRED SCALE FACTOR (F6.3 FORMAT)")
0039 READ(1,22) DSF
0040 22 FORMAT(F6.3)
0041 WRITE(1,23)
0042 23 FORMAT("INPUT PEN NUMBER 1 - 8 (I1 FORMAT)")
0043 READ(1,24) NPEN
0044 WRITE(1,25)
0045 25 FORMAT("INPUT PAGE INFO: 0-FULL;1-HALF;2-MANUAL (I1 FORMAT)")
0046 READ(1,24) IPAG
0047 1 CONTINUE
0048 C
0049 C
0050 C INITIALIZE PLOT PACKAGE
0051 CALL PLOTS(0.0,LU)
0052 IF(ICHG.NE.0) CALL FACTO(DSF)
0053 IF(ICHG.NE.0) CALL HPEN(NPEN)
0054 IP=10
0055 IF(IPAG.EQ.1 .AND. LU.EQ.30) IP=-10

```

LISTING OF THE GENERAL PLOT PACKAGE EVALUATION PROGRAM

AND A PLOT OF THE DATA PRODUCED

PAGE 2 FP2RS OPTS: LXI

3:33 PM WED., 26 DEC., 1984

57 GO TO 400
58 END

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 235 COMMON: (NONE)

```

2      SUBROUTINE FP2AS(FP,NASC,ASC,I)
3 C
4 C      THIS ROUTINE CONVERTS A FLOATING POINT NUMBER TO
5 C      AN ASCII CHARACTER STRING
6 C
7 C      FP - FLOATING POINT VALUE
8 C      NASC - NO. OF CHARACTERS TO BE RETURNED IN ASCII STRING
9 C      ASC - ARRAY IN WHICH ASCII CHARACTER STRING IS RETURNED
10 C      I - NO. OF CHARACTERS TO LEFT OF DECIMAL POINT (OUTPUT)
11 C
12 C      REV 26 JUL 83:  CHANGED 'ALOG10' TO 'ALOGT'
13 C
14      INTEGER ASC(1),IDIG(10)
15      DATA IDIG/1H0,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/
16      DATA IMI/1H-/,IDP/1H./
17 C
18 C      CHECK FOR MINUS SIGN
19      FPX=ABS(FP)
20      I=0
21      IF(NASC.LT.1) RETURN
22      I=1
23      IF(FP.GE.0.) GO TO 100
24      ASC(I)=IMI
25      IF(I.GE.NASC) RETURN
26      I=2
27 C
28 C      CHECK FOR ABSOLUTE VALUE .GT. 1
29 100   IF(FPX.GE.1.) GO TO 200
30      ASC(I)=IDIG(1)
31      IF(I.GE.NASC) RETURN
32      I=I+1
33      GO TO 300
34 C
35 C      GET NEXT INTEGER DIGIT
36 200   IEXP=ALOGT(FPX)+1.001
37       DO 210 J=1,IEXP
38         II=FPX/10.**-(IEXP-J)
39         ASC(I)=IDIG(II+1)
40         IF(I.GE.NASC) RETURN
41         I=I+1
42 210   FPX=FPX-FLOAT(II)*10.**-(IEXP-J)
43 C
44 C      PUT IN DECIMAL POINT
45 300   IX=I
46       I=I-1
47       ASC(IX)=IDP
48       IF(IX.GE.NASC) RETURN
49       IX=IX+1
50 C
51 C      GET NEXT FRACTION DIGIT
52 400   II=FPX*10.
53       ASC(IX)=IDIG(II+1)
54       IF(IX.GE.NASC) RETURN
55       IX=IX+1
56       FPX=FPX*10.-FLOAT(II)

```

```
2      SUBROUTINE HPPEN(I)
3 C
4 C      THIS ROUTINE SELECTS A PEN FOR THE HP-9872T PLOTTER
5 C
6 C      I - THE PEN POSITION NUMBER. IT MUST BE AN INTEGER IN THE
7 C      RANGE 0 THROUGH 8.
8 C
9 C      0: DIRECTS THE PEN ARM TO RETURN THE PEN IT IS CURRENTLY
10 C      HOLDING TO ITS STALL
11 C
12 C      1-8: DIRECTS THE PEN ARM TO FETCH THE DESIRED PEN
13 C
14 C      REAL RE(2)
15 C
16 C      GET UNIT NUMBER
17 C      CALL PXPCO(1,LU,RE,OX,OY,SF,PX,PY)
18 C
19 C      SELECT THE DESIRED PEN
20 C      WRITE(LU,100) I
21 100   FORMAT("SP",I1)
22 C      RETURN
23 C      END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 51 COMMON: (NONE)

```
2      SUBROUTINE HPPAG(ISW)
3 C
4 C      THIS ROUTINE CONTROLS PAGINATION ON THE HP-9872T PLOTTER
5 C
6 C      ISW      1: FULL PAGE ADVANCE
7 C              2: HALF PAGE ADVANCE
8 C              3: MANUALLY PLACE SHEET IN POSITION
9      REAL RE(2)
10     DATA IBELL/003440B/
11 C
12 C      GET UNIT NUMBER
13     CALL PXPCO(1,LU,RE,OX,OY,SF,PX,PY)
14 C
15 C      CHECK FOR AUTOMATIC PAGE ADVANCE
16     IF(ISW.EQ.3) GO TO 250
17 C
18 C      ADVANCE PAPER
19 C
20 C      FULL PAGE ADVANCE
21     IF(ISW.EQ.2) GO TO 150
22     WRITE(LU,100)
23 100   FORMAT("AF")
24     RETURN
25 C
26 C      HALF PAGE ADVANCE
27 150   WRITE(LU,200)
28 200   FORMAT("AH")
29     RETURN
30 C
31 C      MANUALLY LOAD SHEET
32 250   WRITE(1,300) IBELL
33 300   FORMAT(A2,"PLACE NEW SHEET OF PAPER ON PLOTTER.",/
34     *"PRESS (SPACE)(RETURN) TO CONTINUE.")
35     READ(1,350) I
36 350   FORMAT(A1)
37 C
38     RETURN
39     END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 141 COMMON: (NONE)

SANTA CLARA DIVISION AUTO OVERLAY GENERATION-6K15

 * A,OVRLYN <OVERLAY> 54451-14805 REV. A 06 OCT 83
 * T,SNP51C BASE COMMAND FILE FOR USER OVERLAY GENERATION

*ENTER USERCOMMAND NUMBERS, OR TYPE "?"

* INSERT Y COMMAND NUMBERS BEFORE <OE>. AN EXAMPLE:
 * <0,0077> , WHERE <0077>=4-DIGIT Y COMMAND NUMBER
 * 0,7001

Y7001
 Y%COM 01075 01075 00434 00435
 * 0,9000

Y9000
 Y%COM 01074 01074 00436 00437
 * OE
 Y%COM 00440 00441
 47440 47440

TYPE "L" TO LOAD USERCOMMAND LIBRARY

 * CSORT+
 * INSERT PROGRAM LOADS BETWEEN <CSORT+> AND <CSORT->
 * EXAMPLE: <F,Y77JOB> , WHERE <Y77JOB> = FILE NAME
 * <Y,Y0077> , WHERE <Y0077> = PROG NAME
 * F,%PLTAK
 * Y,AXIS

AXIS 56442 57726 01066 01073

*LOAD@

 *
 * F,%Y7001
 * Y,Y7001

Y7001 57727 57770 01068 01065

*LOAD@

 *
 * F,%4SYLE
 * Y,ISSP

ISSP 57771 57777

92068-1X019 REV.2013 750701

*LOAD@

*
* F,%Y9000
* Y,Y9000

Y9000 60000 62236 01052 01062

*LOAD@

*
* F,%PLTPK
* Y,PLOT

PLOT 62237 63055 01051 01051

*LOAD@

*
* F,%PLTPK
* Y,SCALE

SCALE 63056 63552 01045 01050

*LOAD@

*
* F,%PLTPK
* Y,HPPAG

HPPAG 63553 63753

*LOAD@

*
* F,%PLTPK
* Y,HPPEN

HPPEN 63754 64031 01043 01044

*LOAD@

*
* F,%PLTPK
* Y,SYMB0

SYMB0 64032 66043 01012 01042

*LOAD@

*
* F,%PLTPK
* Y,NUMBE

NUMBE 66044 66442 01010 01011

*LOAD@

*
* F,%PLTPK
* Y,FP2AS

FP2AS 66443 67032

*LOAD@

*
* F,%PLTPK
* Y,PLOTS

PLOTS 67033 67370

*LOAD@

*
* F,%PLTPK
* Y,HPOUT

HPOUT 67371 67703

*LOAD@

*
* F,%PLTPK
* Y,CGET

CGET 67704 67777

*LOAD@

*
* F,%PLTPK
* Y,LINE

LINE 70000 70272

*LOAD@

*
* F,%PLTPK
* Y,PXPCO

PXPCO 70273 70550

*LOAD@

*
* F,%PLTPK
* Y,HPCDF

HPCDF 70551 70740 01006 01007

*LOAD@

*
* F,%PLTPK
* Y,HPCSZ

HPCSZ 70741 71123

*LOAD@

*
* F,%PLTPK
* Y,FACTO

FACTO 71124 71234

*LOAD@

*
* F,%PLTPK
* Y,PXPCG

PXPCG 71235 71330

*LOAD@

*
* F,%PLTPK
* Y,WHERE

WHERE 71331 71407

*LOAD@

*
* CSORT-
* F,N3500A
* L,**

FRMTR	71410	75222	00565	01005
MOD	75223	75242		
MXMNI	75243	75356		
MXMNR				

*LX7

MIN1

	75357	75464		
DBLE	75465	75516		
SNGL	75517	75561		
.XPAK	75562	75747		
.XCOM	75750	76015	00556	00564
.XFER	76016	76053		
ALOGT	76054	76062		

*LOAD@

* F,N3501A
* L,**

ABS	76063	76067		
.ITOI	76070	76202		
.GOTO	76203	76224		
IABS	00442	00450		

COMPUTED GO TO

*LOAD@

* F,A3060B
* L,**

D.05			00062	00062
" " "	00451	00453		
D.06			00060	00060
" " "	00454	00456		
D.33			00063	00063
" " "	00457	00461		
D.35			00061	00061
" " "	00462	00464		
D.76			00055	00055
" " "	00465	00467		
I.05			00046	00046
" " "	00470	00471		
C.33			00045	00045
" " "	00472	00473		

*LOAD@

```
*****
* U,**
*****
```

```
*UNDEFINED SYMBOLS
BLANK DTAD GKPLT
```

```
*AVAILABLE MEMORY
76225 76224
00474 00555
```

```
*LOAD@
```

```
*****
* E,01
*****
```

```
*USER LINKS
76225 76233
00556 01777
```

```
*OVERLAY SYMBOL TABLE
```

.BIO. 74637	.DFER 76016	.DIO. 74556 01065,I
.DTA. 74705 01063,I	.GOTO 76203 01051,I	.IAR. 74503
.IAY. 74450	.IIO. 74223 01064,I	.IOI. 74356
.IOR. 74315	.ITOI 76070 01015,I	.LDR. 75601
.LST. 70101	.RAR. 74461	.RAY. 74437
.RIO. 74235 01061,I	.XAY. 74406	.XCOM 75750 00656,I
.XFER 76025 00660,I	.XIO. 74252	.XPAK 75562 00635,I
ABS 76063 01011,I	ALOGT 76054 01045,I	AMAX0 75243
AMAX1 75357 01047,I	AMINO 75255	AMIN1 75371 01046,I
AXIS 56456 01052,I	BCS 70526	BLANK ? ? ? 01233,I
C.33 00472 00045,I	CGET 67707 01037,I	D.05 00451 00062,I
D.06 00454 00060,I	D.33 00457 00063,I	D.35 00462 00061,I
D.76 00465 00055,I	DELE 75465 00613,I	DTAD ? ? ? 01573,I
FACTO 71131 01057,I	FP2AS 66461 01007,I	GKPLT ? ? ? 01234,I
HPCDR 70564 01041,I	HPCSZ 70755 01042,I	HPOUT 67542 01020,I
HPPAG 63560 01055,I	HPPEN 63761 01056,I	I.05 00470 00046,I
IABS 00442 01072,I	ISSR 57771 01062,I	LINE 70006 01053,I
MAX0 75250	MAX1 75364	MIN0 75262 01006,I
MOD 75225 01027,I	NEWIO 74655	NUMBE 66052 01067,I
OLDIO 74662	PLOT 62260 01070,I	PLOTS 67045 01060,I
PXPCG 71240 01030,I	PXPCO 70321 01073,I	SCALE 63074 01054,I
SNGL 75517 00612,I	SYMB0 65104 01066,I	WHERE 71340 01010,I
Y7001 57731 01075,I	Y9000 61017 01074,I	

```
*LINKS
00556 01777
```

```
*AVAILABLE MEMORY
76225 76224
00474 00555
```

```
*END
```

```
*LOAD@
```

```
*****
```

* ::

"\$" ENCOUNTERED, OVERLAY GENERATION TERMINATED

END

FILMED

9-85

DTIC